

Rolling average computation, design and implementation

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Overview

HPE InfoSight generates a series of performance data point at varied frequency. For any storage system, it is utmost important to know performance trend over a period of time along with knowing the current performance values. It helps admin to anticipate which direction storage array is headed as far as performance is concerned. It can be used to re-align storage consumption, add more resources or jumble applications so that system is not subjected to a condition where performance bottle neck becomes a critical concern for data center functionality. Otherwise, it can be as worse as breakage of SLA (Service Level Agreement) for a business application. To avoid these kind of undesired situation, HPE InfoSight does publish (or aim to do so) following set of performance metrics where some are directly reported by system and some are derived using mathematical model.

- Average of last few hours for
 - IOPS
 - Throughput or Bandwidth
 - Service latency
 - IO Size
- Different types of rolling averages: Simple Moving Average (SMA), Exponential Moving Average (EMA), Weighted Moving Average (WMA) for
 - IOPS
 - Throughput or Bandwidth
 - Service latency
 - IO Size
- Machine leaning based forecast of performance metric for
 - IOPS
 - Throughput or Bandwidth
 - Service latency
 - IO Size

This document is focused only towards rolling averages.

Generic aspects of rolling average

This section talks about generic concept of rolling average which will be referred in future section as we do apply it for performance metrics.

Concept

The word 'average' is well known mathematical word which natively takes a bunch of data points and derived a number as per pre-defined equation. As you might have guessed correctly, average of any data set has nothing to do with period. It only has to do with number of data points. Many times, it gets implicitly inferred that we do calculate average for a period like average for 7 days, average of 200 days etc. It is more so because of its usage in common area like equity, finance etc where each data point is for a given day. For e.g. a technical analyst computes average of 50 day, 100 day, 200 day etc where each data point is closing price of scrip. It helps him or her to gauge a trend of price movement.

Significance of moving average

Moving averages lag behind current data point because they are based on past data points; the longer the time period for the moving average, the greater the lag. Thus, 7-day MA will have a much greater degree of lag than a 1-day MA because it contains prices for the past 7 days. Moving averages also impart important trading signals on their own, or when two averages cross over. A rising moving average indicates that the metric is in an uptrend, while a declining moving average indicates that it is in a downtrend. Predicting trends of any point is no simple process. While you can not predict what will happen exactly, you can give yourself better odds using technical analysis and research. There is no "right" time frame to use when setting up your moving averages. The best way to figure out which one works best for you is to experiment with a number of different time periods until you find one that fits your strategy.

To summarize, the moving average is a technique often used in technical analysis that smooths price histories by averaging daily prices over some period of time. It is typically used to determine trend of data points and can give early indication of what is going right or wrong. At the same time, if we do look for only one type of moving average, the ability to determine the trend gets weaker. So, it is important to correlate one or moving average to get a better understanding of trend.

Types

Moving average are of different types. In this section, we will discuss three most commonly used moving average:

1. Simple Moving Average
2. Exponential Moving Average
3. Weighted Moving Average

Simple Moving Average (SMA)

It is plain vanilla average N data points. It is commonly coined as SMA. It is worth to mention that average used in SMA calculation is not tied to a period as such. In other words, it can be average of an hour, 4 hours, 6 hours or a day. Mathematically, it is computed using formula mentioned below:

$$SMA = (D1 + D2 + D3 + + Dn) / N$$

where:

D is data point collected at given point of time. The period can be a an hour, 4 hour or day or something else.

N is number of data point

SMA is simple moving average

Exponential Moving Average (EMA)

It is commonly coined as EMA. It is average of N data points where weight of previous data points decreases exponentially. Its direct impact is that recent values gets higher weight compared to previous values. Because of this nature, the trend of EMA changes much sharply if compared to SMA with change in movement of data points. It can be used to gauged early trend reversal but needs to be looked in association with other averages like SMA. Otherwise, it can give a false signal because of outlier data points. Average of data points are average computed for a given period of time (preferably for time duration). It is worth to mention that average used in SMA calculation is not tied to a period as such. In other words, it can be average of an hour, 4 hours, 6 hours or a day. Mathematically, it is computed using formula mentioned below:

$$EMA = (Current\ data\ point * (S / N + 1)) + Previous\ EMA * (1 - (S / N + 1))$$

where:

S is smoothing

N is number of data point

EMA is exponential moving average

Many times, we do choose 2 as smoothing which effectively translate to below formula:

*EMA = (Current data point * (2 / N + 1)) + Previous EMA * (1 - (2 / N + 1)) = (Current data point - previous EMA) * (2 / N + 1) + previous EMA*

Weighted Moving Average (WMA)

It is commonly coined as WMA. It is average of N data points where a pre-defined weight of previous data points are assigned. The weight for past data points can be in both direction: decreasing or increasing order based on the context of problem. For e.g. if there is need of prediction where we can not trust more on recent data points but have reasonable confidence in past data points, we might like to give more weight of old data points than recent data points. On the other hand, if we are more interested in recent trend change, we might give more weight to recent data points compare to past data points. It is different from EMA in following ways:

- Usage of varying weight
- Choice of increasing or decreasing weight for past data points

Like EMA, the weight decides impact of previous data points and hence can be used to decipher change in trend. It is worth to mention that average used in SMA calculation is not tied to a period as such. In other words, it can be average of an hour, 4 hours, 6 hours or a day. Mathematically, it is computed using formula mentioned below:

*WMA = (D1 * W) + (D2 * (W - 1)) + (D3 * (W - 2)) + + (D3 * (W - N))*

where:

D is data point

W is weight factor which can be varied to get more accurate result

N is number of data point

EMA is exponential moving average

Many times, we do simplify above formula as given below:

*WMA = (D1 * W) + (Previous WMA * (W - 1))*

WMA can have different weights assigned based on the number of periods used in the calculation. If you want a weighted moving average of four different prices, then the most recent weighting could be 4/10, the period before could have a weight of 3/10, the period before that could have a weighting of 2/10, and so on. The "10" in that scenario is a randomly chosen number. A weight of 4/10, for example, means the most recent price will account for 40% of the value of the WMA. The price three periods ago only accounts for 10% of the WMA value. For the following example, assume prices of 90, 89, 88, 89, with the most recent price first. You would calculate this as ((90 x (4/10)) + (89 x (3/10)) + (88 x (2/10)) + (89 x (1/10))) = 36 + 26.7 + 17.6 + 8.9 = 89.2. You can customize the weighted moving average more than the SMA and EMA. The most recent price points are usually given more weight, but it could also work the other way, where you give historical prices more weight.

Preface for rolling average of performance metric

HPE InfoSight generates performance metrics (e.g. IOPS, Throughput, Service latency, IO Size etc.) for a storage system over a period of time.

At this point of time, there are two sets of performance data being generated: lowRes and highRes performance data. The former is getting generated every 6 hours (i.e. 4 times in 24 hours). The later is getting generated every 15 minutes (96 times in 24 hours). Because of varying frequency, the processing pipeline of processing performance data can be different because of following reasons:

- Number of data points generated over a given time (say 24 hours)
- Size of data generated and being processed
- Engineering feasibility to persist data points and state
- Engine or module processing data point. For e.g. highRes data are getting processed by Ultron while lowRes data are getting processed by storeserv-lagom.

In any case, the goal of computing and displaying rolling average of performance metrics are one or more of the following:

- Forecast performance trend
- Early recognition in change in direction of performance trend if SMA and EMA are looked together
- Separate out random variation caused in performance because of spikes at certain point of time. It typically occurs when certain workload abruptly generates high number of IO or array go sluggish because of failure or degradation of software or hardware module

At this point of time, we are planning to compute following rolling average metrics in phased manner starting with lowRes data. In coming days, we might leverage highRes data as well for rolling average.

Phases	Metric
1	24 hours SMA for IOPS, Bandwidth and Service latency
2	1 week SMA for IOPS, Bandwidth and Service latency
3	24 hours EMA for IOPS, Bandwidth and Service latency
4	1 week EMA for IOPS, Bandwidth and Service latency
5	Plot SMA and EMA in portal with sufficient details on how to decipher correlation
6	24 hours and 1 week SMA for IO Size
7	24 hours and 1 week EMA for IO Size
8	Plot SMA and EMA in portal with sufficient details on how to decipher correlation

Design (using lowRes data)

Challenges

Be rolling average for any period (24 hours or 168 hours or some other period), we need to maintain an inventory of data points to compute rolling metrics. The requirement following challenges:

1. Need to maintain history of data points for each forecast period which implicitly translates into following implicit requirement
 - Extra storage
 - Extra states
2. Need for CPU cycles to compute data.
3. Need portal changes to display and plot the moving averages
4. Back-filing the missing data points if there are any

Also, there is specific challenge for specific moving average. For e.g. SMA needs persistence of all data points for the period which it is computed unless and until some smart tweak is applied. The details of challenges and solutions specific to type of moving average is detailed in below section.

Solution

Type	Aspect	Challenge	Current stage	Proposed solution
Simple Moving Average (SMA)	Archiving historical data point	Need to persist more data points for period which SMA is computed.	TBD	<p>Persist new data points if not already persisted. If all data points are not persisted and we do want to save more space then we can adapt tweaked version. The storage mechanism will only store first data point for period we are computing rolling average. Let us illustrate this with following example.</p> <p><u>Problem</u></p> <p>Compute 24 hours rolling SMA.</p> <p><u>Assumption</u></p> <p>Performance metrics are sent every 4 hours, says 6 times in a day. So, we can use D1, D2, D3, D4, D5, D6, D7, D8, D9 to represent data points where D1 is first data point received in 24 hours window slot.</p> <p><u>Solution</u></p> <p>We can compute 4 consecutive SMA using following mathematical formula.</p> $SMA1 = (D1 + D2 + D3 + D4 + D5 + D6) / 6$ $SMA2 = (D2 + D3 + D4 + D5 + D6 + D7) / 6$ $SMA3 = (D3 + D4 + D5 + D6 + D7 + D8) / 6$ $SMA4 = (D4 + D5 + D6 + D7 + D8 + D9) / 6$ <p>In this case, we need to store at least 6 rolling data points ever to compute SMA. However, if we do apply a tweak where we can optimize storage if do store only two values:</p> <ul style="list-style-type: none"> • Previous SMA • first data point of previous SMA <p>In this approach, let us assume SMA1 is calculated somehow with backfilled data points. And we stored D1 and SMA1. Now, new data point D7 comes. We can compute SMA2 as follows:</p>

				$SMA2 = (SMA1 * 6 - D1 + D7) / 6$ <p>The above approach saves us space but not sure about CPU as are using multiplication operator instead of addition which is less costlier. Certainly, it saves a lot of spaces. It is more apparent when we do compute SMA for larger duration say 7 days.</p>
	CPU cycles	Need CPU cycles to do average	No CPU cycles as we do not compute SMA as of now.	Need more CPU cycles but is not very costly though.
	Backfill strategy for missing data point	Need mechanism to backfill missing point	No issue as we do not compute SMA as of now.	Backfill can be tricky where some data points are missing. Let us take above example. Let us assume that we are computing SMA1 and we do only have (D1, D2, D6). In that case, we can assume D3, D4 and D5 as NOOP and compute $SMA1 = (D3+D4+D5) / 3$.
	Portal visualization	Need to define UX and UI as it is not shown anywhere	No issue as we do not compute SMA as of now.	Need to implement.
Exponential Moving Average (EMA)	Archiving historical data point	Need to persist only last data points.	Only one extra points needs to be stored for rolling average of a given period. In our case, we do not need to store only one data point i.e. 24 hour rolling EMA. For 7 days rolling EMA, things are already in place.	No extra persistence is needed. But we need to correct weight which seem to be wrong.
	CPU cycles	Need CPU cycles to do average	It will increase for 24 hour rolling average.	Same as before.
	Backfill strategy for missing data point	Need mechanism to backfill missing point	No issue as we do always have EMA based on previous data points irrespective of how many data points we missed.	Same as before.
	Portal visualization	Need to reconcile UX and UI as it is not shown correctly	Need to rectify portal view more explicit details and ability to read data.	Need to reconcile view.

The above concept can be extended for both rolling average days we are planning for: 24 hours and 7 days.

Sizing aspects

Assumption

- Number of systems = 75000

- Number of data points sent in a day = 6 (i.e. once in every 4 hour)

Sizing calculation

Type	Resource sizing	
24 hours SMA	Storage	
	CPU	
7 days SMA	Storage	
	CPU	
24 hours EMA	Storage	
	CPU	
7 days EMA	Storage	
	CPU	

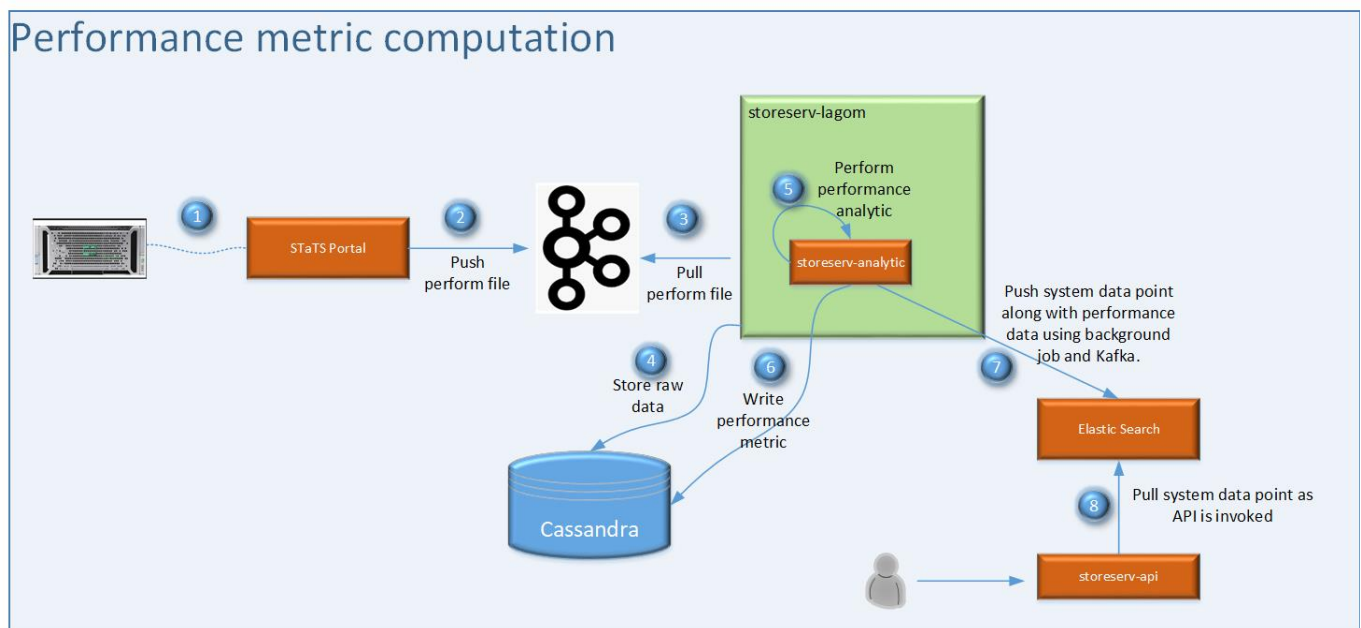
Performance data engineering

In this section, we will cover following aspects:

- Current engineering mechanism of performance metrics
- API response indicating
 - Average (i.e. data point for a given 24 hours)
 - Historical data points already persisted in Cassandra
- Illustration of how we can compute Simple Moving Average (SMA) with data sets already being persisted

Data engineering for performance metric

The performance data engineering follows below processing pipeline at high level.



API response

API as of now already return performance delta. The API <https://infosight.hpe.com/api/storeserv/perform-deltas/system/CZ3739VXFS?count=1&sort=date:asc> gives details of performance metrics computed over a period of 4 hours.

Anatomy of performance metric for one slot of 4 hours

```
{
  "uri": "/api/storeserv/perform-deltas/system/CZ3739VXFS?count=1&sort=date:asc",
  "type": "system-perform-delta",
  "tookMillis": 54,
  "total": 1,
  "count": 1,
  .....
  .....
  .....
  "members": [
    {
      "id": "CZ3739VXFS:2019-12-10T05:39:37Z",
      "systemId": "CZ3739VXFS",
      "timeRange": {
        "from": "2019-12-10T05:39:37Z",
        "to": "2019-12-10T09:39:48Z"
      },
      "portInfo": {
        "portReadAvgBandwidthMBPS": 1314.767585680806,
        "portWriteAvgBandwidthMBPS": 481.97251292686576,
        "portReadAvgIOSizeKiB": 61.107849652334934,
        "portWriteAvgIOSizeKiB": 27.499187356496986,
        "portReadAvgServiceTimeMillis": 0.54579543227064,
        "portWriteAvgServiceTimeMillis": 0.35894259320258415,
        "portReadIOPS": 22032.902851988063,
        "portWriteIOPS": 17947.64596488793,
        "portMin": {
          "portReadMinBandwidthMBPS": 46.47537789871886,
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          "portReadMinIOSizeKiB": 40.796689904666756,
          "portWriteMinIOSizeKiB": 17.530639986707563,
          "portReadMinServiceTimeMillis": 0.5020318432496391,
          "portWriteMinServiceTimeMillis": 0.29824036367008233,
          "portReadMinIOPS": 580.5027409617653,
          "portWriteMinIOPS": 654.5363958087572,
          "portMinOutlierData": {
            "readBandwidthPortId": "3:4:2",
            "writeBandwidthPortId": "3:4:2",
            "readIOSizePortId": "3:4:1",
            "writeIOSizePortId": "0:5:1",
            "readServiceTimePortId": "2:4:1",
            "writeServiceTimePortId": "0:5:1",
            "readIOPSPortId": "3:4:2",
            "writeIOPSPortId": "3:4:2"
          }
        }
      },
      "portMax": {
        "portReadMaxBandwidthMBPS": 117.05167009061003,
        "portWriteMaxBandwidthMBPS": 44.23816818397188,
        "portReadMaxIOSizeKiB": 116.55080264467564,
        "portWriteMaxIOSizeKiB": 36.0643722149245,
        "portReadMaxServiceTimeMillis": 0.656209334588949,
        "portWriteMaxServiceTimeMillis": 0.41403716169827126,
        "portReadMaxIOPS": 2159.4799805703974,
        "portWriteMaxIOPS": 1572.1085975990563,
        "portMaxOutlierData": {
          "readBandwidthPortId": "0:5:2",
```



```

        "writeBandwidthPortId": "3:5:1",
        "readIOSizePortId": "0:5:1",
        "writeIOSizePortId": "0:4:2",
        "readServiceTimePortId": "3:5:2",
        "writeServiceTimePortId": "2:4:1",
        "readIOPSPortId": "0:5:2",
        "writeIOPSPortId": "2:5:1"
    }
},
"portAvg": {
    "portReadAvgBandwidthMBPS": 41.086487052525186,
    "portWriteAvgBandwidthMBPS": 15.061641028964555,
    "portReadAvgIOSizeKiB": 61.107849652334934,
    "portWriteAvgIOSizeKiB": 27.499187356496986,
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    "portWriteAvgServiceTimeMillis": 0.35894259320258415,
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    "portWriteAvgIOPS": 560.8639364027479
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    "systemWriteMaxBandwidthMBPS": 363.525390625,
    "systemReadMaxIOPS": 28023,
    "systemWriteMaxIOPS": 13688,
    "systemReadMaxIOSize": 116.55080264467564,
    "systemWriteMaxIOSize": 36.0643722149245,
    "systemReadMaxServiceTime": 0.656209334588949,
    "systemWriteMaxServiceTime": 0.41403716169827126
}
},
"timeCorrelation": {
    "delAcksPctMetrics": {
        "rollingAvg7Days": 2.076553572178011e-9
    },
    "portWriteAvgServiceTimeMillisMetrics": {
        "rollingAvg7Days": 0.3145262972784242
    },
    "portWriteAvgBandwidthMBPSMetrics": {
        "rollingAvg7Days": 346.6348745990546
    },
    "portReadAvgServiceTimeMillisMetrics": {
        "rollingAvg7Days": 0.447792613671913
    },
    "portReadAvgBandwidthMBPSMetrics": {
        "rollingAvg7Days": 886.8519249088116
    },
    "port": {
        "readAvgServiceTimeMillisMetrics": {
            "rollingAvg7Days": 0.447792613671913
        },
        "writeAvgServiceTimeMillisMetrics": {
            "rollingAvg7Days": 0.3145262972784242
        },
        "readAvgBandwidthMBPSMetrics": {
            "rollingAvg7Days": 886.8519249088116
        },
        "writeAvgBandwidthMBPSMetrics": {
            "rollingAvg7Days": 346.6348745990546
        }
    }
},

```

```
    "readIOSizeKiBMetrics": {
      "rollingAvg7Days": 64.55828041674049
    },
    "writeIOSizeKiBMetrics": {
      "rollingAvg7Days": 25.740223561193073
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    "readIOPSMetrics": {
      "rollingAvg7Days": 14266.74696084295
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    "writeIOPSMetrics": {
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    }
  },
  "maxVVWriteServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.2116536447487025
  },
  "maxVVReadServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.535656105747823
  }
},
.....
.....
.....
"authorized": {
  "tenants": [
    "hp"
  ]
}
```

```
}
]
}
```

As we can see from below, we can get list of array of performance delta for [CZ3739VXFS](https://infosight.hpe.com/api/storeserv/perform-deltas/system/CZ3739VXFS?count=25&sort=date:asc) using API <https://infosight.hpe.com/api/storeserv/perform-deltas/system/CZ3739VXFS?count=25&sort=date:asc>. Note that the response is stored as collapsable entity which you can expand by clicking hyperlink at right side.

Performance delta API

> [Expand](#)

```
{
  "uri": "/api/storeserv/perform-deltas/system/CZ3739VXFS?count=25&sort=date:asc",
  "type": "system-perform-delta",
  "tookMillis": 65,
  "total": 25,
  "count": 25,
  "members": [
    {
      "id": "CZ3739VXFS:2019-12-10T05:39:37Z",
      "systemId": "CZ3739VXFS",
      "timeRange": {
        "from": "2019-12-10T05:39:37Z",
        "to": "2019-12-10T09:39:48Z"
      },
      "filenames": [
        "/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191210.001717.001.bz2",
        "/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191210.041729.001.bz2"
      ],
      "delAcks": 0,
      "delAcksPct": 0,
      "vvInfo": {
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        "vvMaxWriteAvgServiceTimeMillis": 1.8618150964834004,
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  "readServiceTimePortId": "2:4:1",
  "writeServiceTimePortId": "0:5:1",
  "readIOPSPortId": "3:4:2",
  "writeIOPSPortId": "3:4:2"
}
},
"portMax": {
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  "portWriteMaxBandwidthMBPS": 44.23816818397188,
  "portReadMaxIOSizeKiB": 116.55080264467564,
  "portWriteMaxIOSizeKiB": 36.0643722149245,
  "portReadMaxServiceTimeMillis": 0.656209334588949,
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    "readServiceTimePortId": "3:5:2",
    "writeServiceTimePortId": "2:4:1",
    "readIOPSPortId": "0:5:2",
    "writeIOPSPortId": "2:5:1"
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  "portWriteAvgIOSizeKiB": 27.499187356496986,
  "portReadAvgServiceTimeMillis": 0.54579543227064,
  "portWriteAvgServiceTimeMillis": 0.35894259320258415,
  "portReadAvgIOPS": 688.528214124627,
  "portWriteAvgIOPS": 560.8639364027479
},
"totalMax": {
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  "systemWriteMaxIOPS": 13688,
  "systemReadMaxIOSize": 116.55080264467564,
  "systemWriteMaxIOSize": 36.0643722149245,
  "systemReadMaxServiceTime": 0.656209334588949,
  "systemWriteMaxServiceTime": 0.41403716169827126
}
},
"cpuInfo": {
  "cpuSysAvgPct": 20,
  "cpuUserAvgPct": 4,
```

```
"cpuTotalAvgPct": 24,
"cpuSysMaxPct": 22,
"cpuUserMaxPct": 7,
"cpuTotalMaxPct": 28,
"byNode": [
  {
    "nodeId": "0",
    "cpuSysAvgPct": 19,
    "cpuUserAvgPct": 2,
    "cpuTotalAvgPct": 21
  },
  {
    "nodeId": "1",
    "cpuSysAvgPct": 19,
    "cpuUserAvgPct": 2,
    "cpuTotalAvgPct": 21
  },
  {
    "nodeId": "2",
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    "cpuUserAvgPct": 5,
    "cpuTotalAvgPct": 27
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  "pdWriteAvgBandwidthMBPS": 1566.1732270826647,
  "pdReadAvgIOSizeKiB": 17.729911007279956,
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  "pdReadAvgServiceTimeMillis": 0.37588707429646867,
  "pdWriteAvgServiceTimeMillis": 0.6120681693796747,
  "pdReadIOPS": 171782.0532926237,
  "pdWriteIOPS": 92263.29581569634
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      "creditPct": 12.74
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  "portWriteAvgBandwidthMBPSMetrics": {
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  "portReadAvgServiceTimeMillisMetrics": {
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  "portReadAvgBandwidthMBPSMetrics": {
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  "port": {
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    "writeAvgServiceTimeMillisMetrics": {
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    "writeAvgBandwidthMBPSMetrics": {
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    "writeIOSizeKiBMetrics": {
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    "writeIOPSMetrics": {
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      "rollingAvg7Days": 0.2875322724867675
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"writeAvgBandwidthMBPSMetrics": {
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"writeIOSizeKiBMetrics": {
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"readIOPSMetrics": {
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"writeIOPSMetrics": {
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      "rollingAvg7Days": 8.052127930777893
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    "cpuTotalAvgPctMetrics": {
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    },
    "cpuTotalMaxPctMetrics": {
      "rollingAvg7Days": 23.910249469746066
    }
  },
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      "cpuUserAvgPctMetrics": {
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    }
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}
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    "cpuTotalAvgPctMetrics": {
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    "cpuUserAvgPctMetrics": {
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    "cpuTotalAvgPctMetrics": {
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    "cpuUserAvgPctMetrics": {
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    },
    "cpuTotalAvgPctMetrics": {
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  }
]
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"maxVVReadServiceTimeMillisMetrics": {
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},
"authorized": {
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  ]
}
},
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"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191210.001717.0001.bz2"
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      "writeBandwidthPortId": "3:4:2",
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      "writeIOSizePortId": "1:5:1",
      "readServiceTimePortId": "0:4:1",
      "writeServiceTimePortId": "0:5:1",
      "readIOPSPortId": "1:4:1",
      "writeIOPSPortId": "3:4:2"
    }
  }
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  "portWriteMaxIOSizeKiB": 24.332014984486733,
  "portReadMaxServiceTimeMillis": 0.3479421606967784,
  "portWriteMaxServiceTimeMillis": 0.33465016141193676,
  "portReadMaxIOPS": 1093.2711617248801,
  "portWriteMaxIOPS": 1056.2279008402195,
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    "readServiceTimePortId": "1:5:2",
    "writeServiceTimePortId": "1:4:2",
    "readIOPSPortId": "0:4:2",
    "writeIOPSPortId": "2:5:1"
  }
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  "cpuTotalMaxPct": 25,
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      "cpuUserAvgPct": 3,
      "cpuTotalAvgPct": 17
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    {
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      "cpuUserAvgPct": 3,
      "cpuTotalAvgPct": 17
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    {
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    "pdReadAvgIOSizeKiB": 16.921380473715686,
    "pdWriteAvgIOSizeKiB": 15.55180144779041,
    "pdReadAvgServiceTimeMillis": 0.274086127230786,
    "pdWriteAvgServiceTimeMillis": 0.3490743314754451,
    "pdReadIOPS": 97497.23262273453,
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            "totalDataCache": 131072,
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            "creditPct": 12.94
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            "totalDataCache": 131072,
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            "creditPct": 12.97
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            "totalDataCache": 131072,
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            "creditPct": 12.91
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    "portWriteAvgBandwidthMBPSMetrics": {
        "rollingAvg7Days": 343.3713617636913
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    "portReadAvgServiceTimeMillisMetrics": {
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  "port": {
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    "writeAvgServiceTimeMillisMetrics": {
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    "readAvgBandwidthMBPSMetrics": {
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    },
    "writeAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 343.3713617636913
    },
    "readIOSizeKiBMetrics": {
      "rollingAvg7Days": 64.6414836204191
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    "writeIOSizeKiBMetrics": {
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    "readIOPSMetrics": {
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    "writeIOPSMetrics": {
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    "writeAvgServiceTimeMillisMetrics": {
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    "writeAvgBandwidthMBPSMetrics": {
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    "readIOPSMetrics": {
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    "writeIOPSMetrics": {
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  "cpuSysAvgPctMetrics": {
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}
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    "cpuUserAvgPctMetrics": {
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    },
    "cpuUserMaxPctMetrics": {
      "rollingAvg7Days": 8.077498796185054
    },
    "cpuTotalAvgPctMetrics": {
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    },
    "cpuTotalMaxPctMetrics": {
      "rollingAvg7Days": 23.81162979887085
    }
  },
  "byNode": [
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        "rollingAvg7Days": 2.0785449023912625
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    },
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    {
      "nodeId": "2",
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    },
  ],
}
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            "cpuUserAvgPctMetrics": {
                "rollingAvg7Days": 5.348403325341406
            },
            "cpuTotalAvgPctMetrics": {
                "rollingAvg7Days": 20.81878646552971
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        }
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},
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"maxVVReadServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.5310648232189825
},
"authorized": {
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    ]
},
{
    "id": "CZ3739VXFS:2019-12-09T21:39:36Z",
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        "to": "2019-12-10T01:39:36Z"
    },
    "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191209.201716.001.bz2"
    ],
    "delAcks": 0,
    "delAcksPct": 0,
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        "vvMaxWriteAvgServiceTimeMillis": 2.9285608259420504,
        "vvReadIOPS": 11175.8125,
        "vvWriteIOPS": 10766.255555555555
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        "portWriteAvgBandwidthMBPS": 264.35579142252607,
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        "portWriteAvgIOSizeKiB": 25.1381820788328,

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  "portWriteMinIOSizeKiB": 23.723727459251336,
  "portReadMinServiceTimeMillis": 0.2636690315789538,
  "portWriteMinServiceTimeMillis": 0.30225430986880136,
  "portReadMinIOPS": 338.191875,
  "portWriteMinIOPS": 551.3596527777778,
  "portMinOutlierData": {
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    "writeBandwidthPortId": "3:4:2",
    "readIOSizePortId": "3:5:2",
    "writeIOSizePortId": "3:5:2",
    "readServiceTimePortId": "0:5:1",
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    "readIOPSPortId": "2:4:2",
    "writeIOPSPortId": "3:4:2"
  }
},
"portMax": {
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  "portWriteMaxIOSizeKiB": 26.78917100238539,
  "portReadMaxServiceTimeMillis": 1.1168731956637081,
  "portWriteMaxServiceTimeMillis": 0.35032006520756037,
  "portReadMaxIOPS": 1042.403125,
  "portWriteMaxIOPS": 744.6084722222222,
  "portMaxOutlierData": {
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    "writeIOSizePortId": "2:4:2",
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    "readIOPSPortId": "2:5:1",
    "writeIOPSPortId": "2:5:1"
  }
},
"portAvg": {
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  "portReadAvgServiceTimeMillis": 0.7080156665375267,
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  "portWriteAvgIOPS": 336.5414583333333
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  "systemReadMaxIOPS": 4325,
  "systemWriteMaxIOPS": 8876,
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    "systemWriteMaxServiceTime": 0.35032006520756037
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},
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  "cpuUserAvgPct": 4,
  "cpuTotalAvgPct": 18,
  "cpuSysMaxPct": 17,
  "cpuUserMaxPct": 12,
  "cpuTotalMaxPct": 29,
  "byNode": [
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      "nodeId": "0",
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      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 14
    },
    {
      "nodeId": "1",
      "cpuSysAvgPct": 12,
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    },
    {
      "nodeId": "2",
      "cpuSysAvgPct": 13,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 15
    },
    {
      "nodeId": "3",
      "cpuSysAvgPct": 17,
      "cpuUserAvgPct": 12,
      "cpuTotalAvgPct": 29
    }
  ]
},
"pdInfo": {
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  "pdWriteAvgBandwidthMBPS": 762.6329966905382,
  "pdReadAvgIOSizeKiB": 17.084797729611324,
  "pdWriteAvgIOSizeKiB": 14.622805190527085,
  "pdReadAvgServiceTimeMillis": 0.2531655166138864,
  "pdWriteAvgServiceTimeMillis": 0.3160830621976582,
  "pdReadIOPS": 99107.76013888889,
  "pdWriteIOPS": 53404.80520833333
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"cmpInfo": {
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      "totalDataCache": 131072,
      "availableCmpPct": 94.21000000000001,
      "creditPct": 12.95
    }
  ],
}
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  "totalDataCache": 131072,
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  "creditPct": 12.75
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  "totalDataCache": 131072,
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  "creditPct": 13.04
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{
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  "totalDataCache": 131072,
  "availableCmpPct": 94.22,
  "creditPct": 13.09
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  "portWriteAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.3136373997977741
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  "portWriteAvgBandwidthMBPSMetrics": {
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  "portReadAvgServiceTimeMillisMetrics": {
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  "portReadAvgBandwidthMBPSMetrics": {
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  "port": {
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      "rollingAvg7Days": 0.4481911097745134
    },
    "writeAvgServiceTimeMillisMetrics": {
      "rollingAvg7Days": 0.3136373997977741
    },
    "readAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 880.4063459112375
    },
    "writeAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 343.67553011153353
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      "rollingAvg7Days": 64.92346135033446
    },
    "writeIOSizeKiBMetrics": {
      "rollingAvg7Days": 25.785221307435304
    },
    "readIOPSMetrics": {

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    "rollingAvg7Days": 14085.123474602786
  },
  "writeIOPSMetrics": {
    "rollingAvg7Days": 13507.07860617556
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},
"pd": {
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    "rollingAvg7Days": 0.2856743676451225
  },
  "writeAvgServiceTimeMillisMetrics": {
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  },
  "readAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 1963.8586817681612
  },
  "writeAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 1044.7073743421327
  },
  "readIOSizeKiBMetrics": {
    "rollingAvg7Days": 17.046652805115883
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  "writeIOSizeKiBMetrics": {
    "rollingAvg7Days": 15.475719304147955
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  "readIOPSMetrics": {
    "rollingAvg7Days": 116243.06666072033
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  "writeIOPSMetrics": {
    "rollingAvg7Days": 67899.78024901409
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  "rollingAvg7Days": 15.820756641450915
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    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 15.820756641450915
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    "cpuUserAvgPctMetrics": {
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    "cpuUserMaxPctMetrics": {
      "rollingAvg7Days": 8.055269352172878
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    "cpuTotalAvgPctMetrics": {
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    "cpuTotalMaxPctMetrics": {
      "rollingAvg7Days": 23.782993729083092
    }
  }
}
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    "cpuTotalAvgPctMetrics": {
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    "cpuUserAvgPctMetrics": {
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    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 18.29634470203038
    }
  },
  {
    "nodeId": "3",
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 5.404992628447786
    },
    "cpuTotalAvgPctMetrics": {
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    }
  }
]
},
"maxVVWriteServiceTimeMillisMetrics": {
  "rollingAvg7Days": 2.20251058395601
},
"maxVVReadServiceTimeMillisMetrics": {
  "rollingAvg7Days": 2.541872745561143
}
},

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"authorized": {
  "tenants": [
    "hp"
  ]
},
{
  "id": "CZ3739VXFS:2019-12-09T17:39:35Z",
  "systemId": "CZ3739VXFS",
  "timeRange": {
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    "to": "2019-12-09T21:39:36Z"
  },
  "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191209.161715.001.bz2"
],
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  "vvMaxWriteAvgServiceTimeMillis": 1.7916666666666667,
  "vvReadIOPS": 12194.544753836539,
  "vvWriteIOPS": 10849.19116728005
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  "portWriteAvgBandwidthMBPS": 257.41047479748585,
  "portReadAvgIOSizeKiB": 39.92534743472688,
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  "portReadAvgServiceTimeMillis": 0.27498321512868124,
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    "portReadMinServiceTimeMillis": 0.22201170679652765,
    "portWriteMinServiceTimeMillis": 0.2501574490318797,
    "portReadMinIOPS": 323.53503228942435,
    "portWriteMinIOPS": 552.0468717450177,
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      "writeBandwidthPortId": "3:4:2",
      "readIOSizePortId": "1:5:1",
      "writeIOSizePortId": "0:5:1",
      "readServiceTimePortId": "0:5:1",
      "writeServiceTimePortId": "0:5:1",
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      "writeIOPSPortId": "3:4:2"
    }
  }
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"portMax": {
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    "portReadMaxBandwidthMBPS": 45.13049447792254,
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    "portReadMaxIOSizeKiB": 51.20466317321002,
    "portWriteMaxIOSizeKiB": 26.926999194838732,
    "portReadMaxServiceTimeMillis": 0.3425899502253645,
    "portWriteMaxServiceTimeMillis": 0.29539789043329373,
    "portReadMaxIOPS": 1184.7097423790015,
    "portWriteMaxIOPS": 754.2515797514061,
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      "readIOSizePortId": "0:4:2",
      "writeIOSizePortId": "0:4:2",
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      "readIOPSPortId": "2:5:1",
      "writeIOPSPortId": "2:5:1"
    }
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    "portReadAvgIOSizeKiB": 39.92534743472688,
    "portWriteAvgIOSizeKiB": 24.289312366710455,
    "portReadAvgServiceTimeMillis": 0.27498321512868124,
    "portWriteAvgServiceTimeMillis": 0.27598066043023267,
    "portReadAvgIOPS": 381.00488464342754,
    "portWriteAvgIOPS": 339.10769434414277
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    "systemWriteMaxIOPS": 11184,
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    "systemWriteMaxIOSize": 26.926999194838732,
    "systemReadMaxServiceTime": 0.3425899502253645,
    "systemWriteMaxServiceTime": 0.29539789043329373
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  "cpuUserAvgPct": 3,
  "cpuTotalAvgPct": 12,
  "cpuSysMaxPct": 10,
  "cpuUserMaxPct": 6,
  "cpuTotalMaxPct": 15,
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      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 10
    },
    {
      "nodeId": "1",
      "cpuSysAvgPct": 9,
      "cpuUserAvgPct": 6,
      "cpuTotalAvgPct": 15
    }
  ]
}

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    },
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      "nodeId": "2",
      "cpuSysAvgPct": 8,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 10
    },
    {
      "nodeId": "3",
      "cpuSysAvgPct": 10,
      "cpuUserAvgPct": 4,
      "cpuTotalAvgPct": 14
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  ]
},
"pdInfo": {
  "pdReadAvgBandwidthMBPS": 1444.9769027473678,
  "pdWriteAvgBandwidthMBPS": 855.3956798518766,
  "pdReadAvgIOSizeKiB": 16.351745288673737,
  "pdWriteAvgIOSizeKiB": 15.044450681314453,
  "pdReadAvgServiceTimeMillis": 0.2549504713116188,
  "pdWriteAvgServiceTimeMillis": 0.3056778399363041,
  "pdReadIOPS": 90487.7337684883,
  "pdWriteIOPS": 58222.29081313797
},
"cmpInfo": {
  "byNode": [
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      "availableCacheManagementPages": 7895461,
      "totalDataCache": 131072,
      "availableCmpPct": 94.12,
      "creditPct": 12.52
    },
    {
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      "availableCacheManagementPages": 7896310,
      "totalDataCache": 131072,
      "availableCmpPct": 94.13,
      "creditPct": 12.47
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    {
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      "availableCacheManagementPages": 7897442,
      "totalDataCache": 131072,
      "availableCmpPct": 94.14,
      "creditPct": 12.45
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    {
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      "availableCacheManagementPages": 7896015,
      "totalDataCache": 131072,
      "availableCmpPct": 94.12,
      "creditPct": 12.52
    }
  ]
},
"timeCorrelation": {
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  "portWriteAvgBandwidthMBPSMetrics": {
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  "portReadAvgServiceTimeMillisMetrics": {
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  "portReadAvgBandwidthMBPSMetrics": {
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  "port": {
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    "writeAvgServiceTimeMillisMetrics": {
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    "readAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 875.6103169125092
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    "writeAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 345.5867577406064
    },
    "readIOSizeKiBMetrics": {
      "rollingAvg7Days": 64.10526576462964
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    "writeIOSizeKiBMetrics": {
      "rollingAvg7Days": 25.80081186876642
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    "readIOPSMetrics": {
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    "writeIOPSMetrics": {
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  "pd": {
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    },
    "writeAvgServiceTimeMillisMetrics": {
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    },
    "readAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 1971.3355578653484
    },
    "writeAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 1051.5040223509588
    },
    "readIOSizeKiBMetrics": {
      "rollingAvg7Days": 17.045733694251304
    },
    "writeIOSizeKiBMetrics": {
      "rollingAvg7Days": 15.496270468916281
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  },
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"writeIOPSMetrics": {
  "rollingAvg7Days": 68249.04005796388
}
},
"cpuSysAvgPctMetrics": {
  "rollingAvg7Days": 13.820865951486436
},
"cpuSysMaxPctMetrics": {
  "rollingAvg7Days": 15.792342497310875
},
"cpu": {
  "total": {
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    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 15.792342497310875
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 3.492951139717085
    },
    "cpuUserMaxPctMetrics": {
      "rollingAvg7Days": 7.960220145909892
    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 17.667221949559124
    },
    "cpuTotalMaxPctMetrics": {
      "rollingAvg7Days": 23.657288744537997
    }
  },
  "byNode": [
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      },
      "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 2.0576982078374
      },
      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 15.64740136659131
      }
    },
    {
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      "cpuUserAvgPctMetrics": {
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      },
      "cpuTotalAvgPctMetrics": {
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    }
  ]
}
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        "rollingAvg7Days": 4.201048486592183
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      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 18.375770897496928
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    },
    {
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      },
      "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 5.24608438554662
      },
      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 20.691218952730885
      }
    }
  ]
},
"maxVVWriteServiceTimeMillisMetrics": {
  "rollingAvg7Days": 2.1850162338041597
},
"maxVVReadServiceTimeMillisMetrics": {
  "rollingAvg7Days": 2.5549292959214323
}
},
"authorized": {
  "tenants": [
    "hp"
  ]
}
},
{
  "id": "CZ3739VXFS:2019-12-09T13:39:34Z",
  "systemId": "CZ3739VXFS",
  "timeRange": {
    "from": "2019-12-09T13:39:34Z",
    "to": "2019-12-09T17:39:35Z"
  },
  "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191209.121722.001.bz2"
  ],
  "delAcks": 0,
  "delAcksPct": 0,
  "vvInfo": {
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"vvMaxWriteAvgServiceTimeMillis": 1.9004362732205007,
"vvReadIOPS": 10351.663148392472,
"vvWriteIOPS": 12526.84494132352
},
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  "portWriteAvgBandwidthMBPS": 446.3089560702165,
  "portReadAvgIOSizeKiB": 65.75540320540038,
  "portWriteAvgIOSizeKiB": 36.49813625522039,
  "portReadAvgServiceTimeMillis": 0.42575788381248947,
  "portWriteAvgServiceTimeMillis": 0.4332946009962151,
  "portReadIOPS": 10354.317964030275,
  "portWriteIOPS": 12522.558294562878,
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    "portReadMinIOSizeKiB": 45.423662741482666,
    "portWriteMinIOSizeKiB": 24.88231638851069,
    "portReadMinServiceTimeMillis": 0.31375878633997767,
    "portWriteMinServiceTimeMillis": 0.34501232595005554,
    "portReadMinIOPS": 329.0152072772724,
    "portWriteMinIOPS": 543.9643774737865,
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      "writeBandwidthPortId": "3:4:2",
      "readIOSizePortId": "0:4:1",
      "writeIOSizePortId": "0:5:1",
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      "writeServiceTimePortId": "0:5:1",
      "readIOPSPortId": "3:4:2",
      "writeIOPSPortId": "3:4:2"
    }
  }
},
"portMax": {
  "portReadMaxBandwidthMBPS": 67.75278562062748,
  "portWriteMaxBandwidthMBPS": 40.80530323415041,
  "portReadMaxIOSizeKiB": 72.71027866789288,
  "portWriteMaxIOSizeKiB": 44.24095638305092,
  "portReadMaxServiceTimeMillis": 0.46921243874777463,
  "portWriteMaxServiceTimeMillis": 0.48704451071716875,
  "portReadMaxIOPS": 954.6909936809943,
  "portWriteMaxIOPS": 990.1035344767724,
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    "writeBandwidthPortId": "0:5:2",
    "readIOSizePortId": "3:5:1",
    "writeIOSizePortId": "0:4:2",
    "readServiceTimePortId": "1:5:2",
    "writeServiceTimePortId": "1:4:2",
    "readIOPSPortId": "2:5:1",
    "writeIOPSPortId": "2:5:1"
  }
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  "portWriteAvgBandwidthMBPS": 13.947154877194265,
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  "portWriteAvgIOSizeKiB": 36.49813625522039,
  "portReadAvgServiceTimeMillis": 0.42575788381248947,

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    "portReadAvgIOPS": 323.5724363759461,
    "portWriteAvgIOPS": 391.3299467050899
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  "totalMax": {
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    "systemWriteMaxBandwidthMBPS": 302.0458984375,
    "systemReadMaxIOPS": 8285,
    "systemWriteMaxIOPS": 10318,
    "systemReadMaxIOSize": 72.71027866789288,
    "systemWriteMaxIOSize": 44.24095638305092,
    "systemReadMaxServiceTime": 0.46921243874777463,
    "systemWriteMaxServiceTime": 0.48704451071716875
  }
},
"cpuInfo": {
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  "cpuUserAvgPct": 4,
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  "cpuSysMaxPct": 12,
  "cpuUserMaxPct": 10,
  "cpuTotalMaxPct": 22,
  "byNode": [
    {
      "nodeId": "0",
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      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 12
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    {
      "nodeId": "1",
      "cpuSysAvgPct": 12,
      "cpuUserAvgPct": 10,
      "cpuTotalAvgPct": 22
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    {
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      "cpuSysAvgPct": 10,
      "cpuUserAvgPct": 2,
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      "cpuSysAvgPct": 11,
      "cpuUserAvgPct": 3,
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  "pdReadAvgIOSizeKiB": 18.116125003936542,
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  "pdReadIOPS": 131095.65557947365,
  "pdWriteIOPS": 78471.60544406639
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      "creditPct": 12.89
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    {
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      "totalDataCache": 131072,
      "availableCmpPct": 94.22,
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      "totalDataCache": 131072,
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  "portWriteAvgBandwidthMBPSMetrics": {
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  "portReadAvgServiceTimeMillisMetrics": {
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  "port": {
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    "writeAvgServiceTimeMillisMetrics": {
      "rollingAvg7Days": 0.3141729864513996
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    "readAvgBandwidthMBPSMetrics": {
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  "writeIOSizeKiBMetrics": {
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  "readIOPSMetrics": {
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  "writeIOPSMetrics": {
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  "writeIOSizeKiBMetrics": {
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  "readIOPSMetrics": {
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  "writeIOPSMetrics": {
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  "rollingAvg7Days": 15.931920150663348
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    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 15.931920150663348
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      "rollingAvg7Days": 3.504829747263355
    }
  },
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},
"cpuTotalMaxPctMetrics": {
  "rollingAvg7Days": 23.86590279799191
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},
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    }
  },
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    },
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    }
  }
]
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    ]
  },
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  "maxVVReadServiceTimeMillisMetrics": {
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},
"authorized": {
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}
},
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      "portReadMinServiceTimeMillis": 0.36734213179643493,
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      "portWriteMinIOPS": 632.1107328933657,
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        "readIOSizePortId": "2:4:1",
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        "writeServiceTimePortId": "0:5:1",
        "readIOPSPortId": "3:4:2",
        "writeIOPSPortId": "3:4:2"
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    "portReadMaxIOSizeKiB": 64.89535793597808,
    "portWriteMaxIOSizeKiB": 31.065050019434395,
    "portReadMaxServiceTimeMillis": 0.41203524891552884,
    "portWriteMaxServiceTimeMillis": 0.3900046482675362,
    "portReadMaxIOPS": 2015.8315387287253,
    "portWriteMaxIOPS": 1328.1618617575548,
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        "readServiceTimePortId": "3:5:2",
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        "readIOPSPortId": "2:5:1",
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    "cpuUserMaxPct": 9,
    "cpuTotalMaxPct": 24,
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    "cpuUserAvgPct": 2,
    "cpuTotalAvgPct": 14
  },
  {
    "nodeId": "3",
    "cpuSysAvgPct": 14,
    "cpuUserAvgPct": 4,
    "cpuTotalAvgPct": 18
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},
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  "pdReadAvgIOSizeKiB": 17.564355968963874,
  "pdWriteAvgIOSizeKiB": 17.11731683342972,
  "pdReadAvgServiceTimeMillis": 0.33254516189632277,
  "pdWriteAvgServiceTimeMillis": 0.5070327092787607,
  "pdReadIOPS": 144120.7855505384,
  "pdWriteIOPS": 80636.86425842307
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      "totalDataCache": 131072,
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      "creditPct": 12.56
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        "writeAvgServiceTimeMillisMetrics": {
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        "writeIOSizeKiBMetrics": {
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        "writeIOPSMetrics": {
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        "writeAvgServiceTimeMillisMetrics": {
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"writeIOSizeKiBMetrics": {
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"readIOPSMetrics": {
  "rollingAvg7Days": 116953.7616208467
},
"writeIOPSMetrics": {
  "rollingAvg7Days": 68250.14364182978
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"cpuSysAvgPctMetrics": {
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"cpuSysMaxPctMetrics": {
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    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 16.026667342849183
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    "cpuUserAvgPctMetrics": {
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    "cpuUserMaxPctMetrics": {
      "rollingAvg7Days": 7.959441226563643
    },
    "cpuTotalAvgPctMetrics": {
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    },
    "cpuTotalMaxPctMetrics": {
      "rollingAvg7Days": 23.910865321193608
    }
  },
  "byNode": [
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      "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 2.060512409972765
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      "cpuTotalAvgPctMetrics": {
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    {
      "nodeId": "1",
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        },
        "cpuTotalAvgPctMetrics": {
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        "cpuUserAvgPctMetrics": {
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        },
        "cpuTotalAvgPctMetrics": {
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        }
      },
      {
        "nodeId": "3",
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        "cpuUserAvgPctMetrics": {
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        },
        "cpuTotalAvgPctMetrics": {
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        }
      }
    ]
  },
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  "maxVVReadServiceTimeMillisMetrics": {
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  }
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  ]
}
},
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    "to": "2019-12-09T09:39:39Z"
  },
  "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191209.041726.0
001.bz2"
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  "delAcksPct": 0,
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    "vvReadIOPS": 18311.820144384285,
    "vvWriteIOPS": 17645.630709426627
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    "portReadAvgIOSizeKiB": 71.02012497902965,
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      "portReadMinServiceTimeMillis": 0.4137450549355055,
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      "portWriteMinIOPS": 724.7018603359711,
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        "readIOSizePortId": "3:4:1",
        "writeIOSizePortId": "0:5:1",
        "readServiceTimePortId": "2:4:1",
        "writeServiceTimePortId": "0:5:1",
        "readIOPSPortId": "2:4:2",
        "writeIOPSPortId": "3:4:2"
      }
    }
  },
  "portMax": {
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    "portReadMaxIOSizeKiB": 118.24093551239879,
    "portWriteMaxIOSizeKiB": 35.08430546003666,
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    "portWriteMaxServiceTimeMillis": 0.3960920128156449,
    "portReadMaxIOPS": 1602.6928363182008,
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      "writeIOSizePortId": "0:4:2",
      "readServiceTimePortId": "3:5:2",
      "writeServiceTimePortId": "1:4:2",
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        "writeIOPSPortId": "0:5:2"
    }
},
"portAvg": {
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    "portReadAvgIOPS": 571.895338747744,
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    "systemReadMaxIOSize": 118.24093551239879,
    "systemWriteMaxIOSize": 35.08430546003666,
    "systemReadMaxServiceTime": 0.6279071969251894,
    "systemWriteMaxServiceTime": 0.3960920128156449
}
},
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    "cpuUserAvgPct": 4,
    "cpuTotalAvgPct": 27,
    "cpuSysMaxPct": 24,
    "cpuUserMaxPct": 9,
    "cpuTotalMaxPct": 33,
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            "cpuUserAvgPct": 3,
            "cpuTotalAvgPct": 25
        },
        {
            "nodeId": "1",
            "cpuSysAvgPct": 24,
            "cpuUserAvgPct": 9,
            "cpuTotalAvgPct": 33
        },
        {
            "nodeId": "2",
            "cpuSysAvgPct": 21,
            "cpuUserAvgPct": 2,
            "cpuTotalAvgPct": 23
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        {
            "nodeId": "3",
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            "cpuTotalAvgPct": 28
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},
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  "portReadAvgServiceTimeMillisMetrics": {
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  "portReadAvgBandwidthMBPSMetrics": {
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  "port": {
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  "writeAvgServiceTimeMillisMetrics": {
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  "readAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 891.4268460496079
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  "writeAvgBandwidthMBPSMetrics": {
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  "writeIOSizeKiBMetrics": {
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  "readIOPSMetrics": {
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  "writeIOPSMetrics": {
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  "writeAvgServiceTimeMillisMetrics": {
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  "writeAvgBandwidthMBPSMetrics": {
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  "writeIOSizeKiBMetrics": {
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  "writeIOPSMetrics": {
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"cpuSysMaxPctMetrics": {
  "rollingAvg7Days": 16.05139644012022
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"cpuSysMaxPctMetrics": {
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"cpuUserMaxPctMetrics": {
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"cpuTotalAvgPctMetrics": {
  "rollingAvg7Days": 17.892335110689586
},
"cpuTotalMaxPctMetrics": {
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},
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    "cpuTotalAvgPctMetrics": {
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    "cpuUserAvgPctMetrics": {
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    "cpuTotalAvgPctMetrics": {
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 4.364005539368369
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    }
  },
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        "rollingAvg7Days": 5.3630169615401115
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      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 21.090263660499204
      }
    }
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  },
  "maxVVWriteServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.1814780858511873
  },
  "maxVVReadServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.584436682330674
  }
},
"authorized": {
  "tenants": [
    "hp"
  ]
}
},
{
  "id": "CZ3739VXFS:2019-12-09T01:39:33Z",
  "systemId": "CZ3739VXFS",
  "timeRange": {
    "from": "2019-12-09T01:39:33Z",
    "to": "2019-12-09T05:39:33Z"
  },
  "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191208.201718.001.bz2",

"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191209.001721.001.bz2"

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    "vvMaxWriteAvgServiceTimeMillis": 2.1400707575172904,
    "vvReadIOPS": 12281.080833333333,
    "vvWriteIOPS": 11509.096180555556
  },
  "portInfo": {
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    "portReadAvgIOSizeKiB": 79.24535982525217,
    "portWriteAvgIOSizeKiB": 28.304262456987647,
    "portReadAvgServiceTimeMillis": 0.43355218358945186,
    "portWriteAvgServiceTimeMillis": 0.3259705319627605,
    "portReadIOPS": 12279.01125,
    "portWriteIOPS": 11490.349791666667,
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"portReadMinIOSizeKiB": 66.46504244706526,
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"portReadMinServiceTimeMillis": 0.40362196418623864,
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  "writeServiceTimePortId": "0:5:1",
  "readIOPSPortId": "1:4:1",
  "writeIOPSPortId": "3:4:2"
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"portMax": {
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  "portWriteMaxIOSizeKiB": 31.889933390990862,
  "portReadMaxServiceTimeMillis": 0.4753692630066789,
  "portWriteMaxServiceTimeMillis": 0.3604514547361899,
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  "portWriteMaxIOPS": 835.7589583333333,
  "portMaxOutlierData": {
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    "writeIOSizePortId": "0:4:2",
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    "readIOPSPortId": "2:4:1",
    "writeIOPSPortId": "2:5:1"
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  "portWriteAvgIOPS": 359.07343098958336
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  "systemWriteMaxIOPS": 9302,
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  "systemWriteMaxIOSize": 31.889933390990862,
  "systemReadMaxServiceTime": 0.4753692630066789,
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"cpuUserAvgPct": 3,
"cpuTotalAvgPct": 14,
"cpuSysMaxPct": 13,
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    "cpuUserAvgPct": 2,
    "cpuTotalAvgPct": 13
  },
  {
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    "cpuSysAvgPct": 10,
    "cpuUserAvgPct": 2,
    "cpuTotalAvgPct": 12
  },
  {
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    "cpuSysAvgPct": 11,
    "cpuUserAvgPct": 2,
    "cpuTotalAvgPct": 13
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    "nodeId": "3",
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    "cpuUserAvgPct": 6,
    "cpuTotalAvgPct": 19
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  "pdReadAvgIOSizeKiB": 18.199317709836393,
  "pdWriteAvgIOSizeKiB": 15.100699452116574,
  "pdReadAvgServiceTimeMillis": 0.27540402241086637,
  "pdWriteAvgServiceTimeMillis": 0.36854960180485863,
  "pdReadIOPS": 107320.96625,
  "pdWriteIOPS": 61523.933125
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      "totalDataCache": 131072,
      "availableCmpPct": 94.11,
      "creditPct": 12.49
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      "availableCacheManagementPages": 7895183,
      "totalDataCache": 131072,
      "availableCmpPct": 94.11,
      "creditPct": 12.5
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}
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      "totalDataCache": 131072,
      "availableCmpPct": 94.12,
      "creditPct": 12.47
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  "portWriteAvgBandwidthMBPSMetrics": {
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  "portReadAvgServiceTimeMillisMetrics": {
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  "portReadAvgBandwidthMBPSMetrics": {
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      "rollingAvg7Days": 0.4468350488036573
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    "writeAvgServiceTimeMillisMetrics": {
      "rollingAvg7Days": 0.30904220802735666
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    "readAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 882.3218747584183
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    "writeAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 340.1192860606634
    },
    "readIOSizeKiBMetrics": {
      "rollingAvg7Days": 65.01709182793888
    },
    "writeIOSizeKiBMetrics": {
      "rollingAvg7Days": 25.478530295505365
    },
    "readIOPSMetrics": {
      "rollingAvg7Days": 14061.28739164957
    },
    "writeIOPSMetrics": {
      "rollingAvg7Days": 13515.46010503333
    }
  },
  "pd": {

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  "rollingAvg7Days": 1946.3272177477536
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"writeAvgBandwidthMBPSMetrics": {
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"readIOSizeKiBMetrics": {
  "rollingAvg7Days": 17.0098623525372
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"writeIOSizeKiBMetrics": {
  "rollingAvg7Days": 15.364434814216612
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"writeIOPSMetrics": {
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"cpuSysAvgPctMetrics": {
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"cpuSysMaxPctMetrics": {
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    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 15.859792225295942
    },
    "cpuUserAvgPctMetrics": {
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    },
    "cpuUserMaxPctMetrics": {
      "rollingAvg7Days": 7.908690280903807
    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 17.672791266685703
    },
    "cpuTotalMaxPctMetrics": {
      "rollingAvg7Days": 23.689569435478308
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  "byNode": [
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      },

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    "cpuTotalAvgPctMetrics": {
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    "cpuUserAvgPctMetrics": {
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    },
    "cpuTotalAvgPctMetrics": {
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 4.420990822606947
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    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 18.750145501609296
    }
  },
  {
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 5.371767628164733
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    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 20.923701748586108
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  }
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"maxVVWriteServiceTimeMillisMetrics": {
  "rollingAvg7Days": 2.185852686482025
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"maxVVReadServiceTimeMillisMetrics": {
  "rollingAvg7Days": 2.5844395679228156
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},
"authorized": {
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  ]
}
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  "to": "2019-12-09T01:39:33Z"
},
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001.bz2",

"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191208.201718.0
001.bz2"
],
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"delAcksPct": 0,
"vvInfo": {
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  "vvReadIOPS": 27058.883541666666,
  "vvWriteIOPS": 10991.176458333333
},
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  "portReadAvgIOSizeKiB": 109.5210306119087,
  "portWriteAvgIOSizeKiB": 36.0404457076715,
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  "portWriteAvgServiceTimeMillis": 0.4497016476095471,
  "portReadIOPS": 27072.865625,
  "portWriteIOPS": 11000.263333333334,
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    "portWriteMinServiceTimeMillis": 0.33130827408219526,
    "portReadMinIOPS": 380.7245833333333,
    "portWriteMinIOPS": 537.7664583333334,
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      "writeBandwidthPortId": "3:4:2",
      "readIOSizePortId": "1:4:1",
      "writeIOSizePortId": "0:5:1",
      "readServiceTimePortId": "1:4:1",
      "writeServiceTimePortId": "0:5:1",
      "readIOPSPortId": "0:4:1",
      "writeIOPSPortId": "3:4:2"
    }
  }
},
"portMax": {
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  "portWriteMaxIOSizeKiB": 43.99335127910172,
  "portReadMaxServiceTimeMillis": 1.058461455425026,
  "portWriteMaxServiceTimeMillis": 0.5549285405619546,
  "portReadMaxIOPS": 3288.626875,
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"portMaxOutlierData": {
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  "readIOSizePortId": "0:4:2",
  "writeIOSizePortId": "0:4:2",
  "readServiceTimePortId": "1:4:2",
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  "readIOPSPortId": "2:4:1",
  "writeIOPSPortId": "2:5:1"
}
},
"portAvg": {
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  "portWriteAvgIOSizeKiB": 36.0404457076715,
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  "portReadAvgIOPS": 846.02705078125,
  "portWriteAvgIOPS": 343.7582291666667
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"totalMax": {
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  "systemWriteMaxIOPS": 8811,
  "systemReadMaxIOSize": 160.47590713483373,
  "systemWriteMaxIOSize": 43.99335127910172,
  "systemReadMaxServiceTime": 1.058461455425026,
  "systemWriteMaxServiceTime": 0.5549285405619546
}
},
"cpuInfo": {
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  "cpuUserAvgPct": 4,
  "cpuTotalAvgPct": 17,
  "cpuSysMaxPct": 14,
  "cpuUserMaxPct": 8,
  "cpuTotalMaxPct": 22,
  "byNode": [
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      "nodeId": "0",
      "cpuSysAvgPct": 13,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 15
    },
    {
      "nodeId": "1",
      "cpuSysAvgPct": 14,
      "cpuUserAvgPct": 8,
      "cpuTotalAvgPct": 22
    },
    {
      "nodeId": "2",
      "cpuSysAvgPct": 13,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 15
    }
  ],
}
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      "cpuUserAvgPct": 4,
      "cpuTotalAvgPct": 18
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},
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  "pdReadAvgIOSizeKiB": 19.150052216767538,
  "pdWriteAvgIOSizeKiB": 16.7116611086867,
  "pdReadAvgServiceTimeMillis": 0.31968575232254576,
  "pdWriteAvgServiceTimeMillis": 0.5210561784114,
  "pdReadIOPS": 187301.09756944445,
  "pdWriteIOPS": 67700.45402777777
},
"cmpInfo": {
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    ]
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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191208.121717.001.bz2"
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        "writeIOSizePortId": "0:5:1",
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    }
  }
}

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  "portWriteMaxIOSizeKiB": 35.834270974613666,
  "portReadMaxServiceTimeMillis": 0.398774073813026,
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        "cpuSysAvgPct": 14,
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        "cpuTotalAvgPct": 17
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    "cpuUserMaxPctMetrics": {
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    "cpuTotalMaxPctMetrics": {
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      "readServiceTimePortId": "0:4:1",
      "writeServiceTimePortId": "0:5:1",
      "readIOPSPortId": "3:4:2",
      "writeIOPSPortId": "3:4:2"
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  "portReadMaxIOPS": 1179.061362056984,
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  "cpuTotalMaxPct": 15,
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    "writeIOPSMetrics": {
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      "cpuSysMaxPctMetrics": {
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  "cpuTotalAvgPctMetrics": {
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  "cpuTotalMaxPctMetrics": {
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},
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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191208.041735.001.bz2"
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        "vvWriteIOPS": 19204.996114079524
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        "readServiceTimePortId": "3:4:1",
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        "readIOPSPortId": "3:4:2",
        "writeIOPSPortId": "3:4:2"
    }
},
"portMax": {
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    "portReadMaxIOSizeKiB": 98.53389238659835,
    "portWriteMaxIOSizeKiB": 36.53950125692492,
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        "readIOPSPortId": "3:5:1",
        "writeIOPSPortId": "2:5:1"
    }
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    "portReadAvgIOPS": 889.3020457463049,
    "portWriteAvgIOPS": 599.8742930747346
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    "systemWriteMaxIOPS": 17015,
    "systemReadMaxIOSize": 98.53389238659835,
    "systemWriteMaxIOSize": 36.53950125692492,
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    "cpuUserAvgPct": 3,
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    "cpuUserMaxPct": 5,
    "cpuTotalMaxPct": 32,
    "byNode": [

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      "cpuSysAvgPct": 25,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 27
    },
    {
      "nodeId": "2",
      "cpuSysAvgPct": 27,
      "cpuUserAvgPct": 5,
      "cpuTotalAvgPct": 32
    },
    {
      "nodeId": "3",
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      "cpuUserAvgPct": 3,
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  "pdReadAvgIOSizeKiB": 18.73541878209984,
  "pdWriteAvgIOSizeKiB": 17.17367428606916,
  "pdReadAvgServiceTimeMillis": 0.3702618258510029,
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      "creditPct": 12.87
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    {
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      "availableCacheManagementPages": 7908408,
      "totalDataCache": 131072,
      "availableCmpPct": 94.27,
      "creditPct": 12.93
    }
  ]
},

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  "nodeId": 3,
  "availableCacheManagementPages": 7905430,
  "totalDataCache": 131072,
  "availableCmpPct": 94.24,
  "creditPct": 13.05
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]
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"timeCorrelation": {
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    "rollingAvg7Days": 2.7633271499181833e-9
  },
  "portWriteAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.30495627471009523
  },
  "portWriteAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 334.8216768227038
  },
  "portReadAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.44363981267252856
  },
  "portReadAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 842.2514810281223
  },
  "port": {
    "readAvgServiceTimeMillisMetrics": {
      "rollingAvg7Days": 0.44363981267252856
    },
    "writeAvgServiceTimeMillisMetrics": {
      "rollingAvg7Days": 0.30495627471009523
    },
    "readAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 842.2514810281223
    },
    "writeAvgBandwidthMBPSMetrics": {
      "rollingAvg7Days": 334.8216768227038
    },
    "readIOSizeKiBMetrics": {
      "rollingAvg7Days": 64.67365458116255
    },
    "writeIOSizeKiBMetrics": {
      "rollingAvg7Days": 25.029087314568358
    },
    "readIOPSMetrics": {
      "rollingAvg7Days": 13716.464675191764
    },
    "writeIOPSMetrics": {
      "rollingAvg7Days": 13491.657151463669
    }
  },
  "pd": {
    "readAvgServiceTimeMillisMetrics": {
      "rollingAvg7Days": 0.27941538055517956
    },
    "writeAvgServiceTimeMillisMetrics": {
      "rollingAvg7Days": 0.35667750232181017
    },
    "readAvgBandwidthMBPSMetrics": {
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    "rollingAvg7Days": 1891.811709343808
  },
  "writeAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 1013.7738083638126
  },
  "readIOSizeKiBMetrics": {
    "rollingAvg7Days": 16.909536132410917
  },
  "writeIOSizeKiBMetrics": {
    "rollingAvg7Days": 15.245129566831212
  },
  "readIOPSMetrics": {
    "rollingAvg7Days": 112731.38616408354
  },
  "writeIOPSMetrics": {
    "rollingAvg7Days": 66785.90154795875
  }
},
"cpuSysAvgPctMetrics": {
  "rollingAvg7Days": 14.10259163446401
},
"cpuSysMaxPctMetrics": {
  "rollingAvg7Days": 16.067859188099497
},
"cpu": {
  "total": {
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    "cpuSysAvgPctMetrics": {
      "rollingAvg7Days": 14.10259163446401
    },
    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 16.067859188099497
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 3.451517107615712
    },
    "cpuUserMaxPctMetrics": {
      "rollingAvg7Days": 7.946572486976267
    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 17.857843248565203
    },
    "cpuTotalMaxPctMetrics": {
      "rollingAvg7Days": 23.94962161000205
    }
  },
  "byNode": [
    {
      "nodeId": "0",
      "cpuSysAvgPctMetrics": {
        "rollingAvg7Days": 13.816188711804928
      },
      "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 2.0196564746915495
      },
      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 15.835845186496478
      }
    }
  ]
},
```

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      "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 3.2518832025969138
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      "cpuTotalAvgPctMetrics": {
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    {
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      "cpuSysAvgPctMetrics": {
        "rollingAvg7Days": 14.496052315061434
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      "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 4.427344069187573
      },
      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 18.923396384249003
      }
    },
    {
      "nodeId": "3",
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        "rollingAvg7Days": 15.7963058599161
      },
      "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 5.566193163387377
      },
      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 21.362499023303464
      }
    }
  ],
  "maxVVWriteServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.185667678948737
  },
  "maxVVReadServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.5167710943937935
  }
},
"authorized": {
  "tenants": [
    "hp"
  ]
}
},
{
  "id": "CZ3739VXFS:2019-12-08T01:39:30Z",
  "systemId": "CZ3739VXFS",
  "timeRange": {
    "from": "2019-12-08T01:39:30Z",
    "to": "2019-12-08T05:39:30Z"
  },
  "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191207.201718.0001.bz2",
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```
"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191208.001721.0001.bz2"
```

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  "delAcks": 0,
  "delAcksPct": 0,
  "vvInfo": {
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    "vvMaxWriteAvgServiceTimeMillis": 2.2129446117370617,
    "vvReadIOPS": 13952.339513888888,
    "vvWriteIOPS": 13166.986319444444
  },
  "portInfo": {
    "portReadAvgBandwidthMBPS": 716.4718964979384,
    "portWriteAvgBandwidthMBPS": 317.02178921169707,
    "portReadAvgIOSizeKiB": 52.58376766083316,
    "portWriteAvgIOSizeKiB": 24.66778775932804,
    "portReadAvgServiceTimeMillis": 0.3415177609187547,
    "portWriteAvgServiceTimeMillis": 0.3053687638472158,
    "portReadIOPS": 13952.231180555556,
    "portWriteIOPS": 13160.581597222223,
    "portMin": {
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      "portWriteMinBandwidthMBPS": 14.650328301323785,
      "portReadMinIOSizeKiB": 45.5533574119669,
      "portWriteMinIOSizeKiB": 20.864318177347528,
      "portReadMinServiceTimeMillis": 0.3272445413054447,
      "portWriteMinServiceTimeMillis": 0.259616929314729,
      "portReadMinIOPS": 604.3009722222222,
      "portWriteMinIOPS": 644.3207638888889,
      "portMinOutlierData": {
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        "writeBandwidthPortId": "3:4:2",
        "readIOSizePortId": "2:4:1",
        "writeIOSizePortId": "0:5:1",
        "readServiceTimePortId": "2:4:1",
        "writeServiceTimePortId": "0:5:1",
        "readIOPSPortId": "3:4:2",
        "writeIOPSPortId": "3:4:2"
      }
    }
  },
  "portMax": {
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    "portWriteMaxBandwidthMBPS": 24.24842051188151,
    "portReadMaxIOSizeKiB": 61.58415668789488,
    "portWriteMaxIOSizeKiB": 28.109400292908475,
    "portReadMaxServiceTimeMillis": 0.35852122114027885,
    "portWriteMaxServiceTimeMillis": 0.341677408795146,
    "portReadMaxIOPS": 1123.2049305555556,
    "portWriteMaxIOPS": 949.1085416666666,
    "portMaxOutlierData": {
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      "writeBandwidthPortId": "3:4:1",
      "readIOSizePortId": "3:5:2",
      "writeIOSizePortId": "0:4:2",
      "readServiceTimePortId": "3:5:2",

```

```

        "writeServiceTimePortId": "1:4:2",
        "readIOPSPortId": "2:4:1",
        "writeIOPSPortId": "0:5:2"
    }
},
"portAvg": {
    "portReadAvgBandwidthMBPS": 22.389746765560574,
    "portWriteAvgBandwidthMBPS": 9.906930912865533,
    "portReadAvgIOSizeKiB": 52.58376766083316,
    "portWriteAvgIOSizeKiB": 24.66778775932804,
    "portReadAvgServiceTimeMillis": 0.3415177609187547,
    "portWriteAvgServiceTimeMillis": 0.3053687638472158,
    "portReadAvgIOPS": 436.00722439236114,
    "portWriteAvgIOPS": 411.26817491319446
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    "systemWriteMaxBandwidthMBPS": 335.265625,
    "systemReadMaxIOPS": 7121,
    "systemWriteMaxIOPS": 12015,
    "systemReadMaxIOSize": 61.58415668789488,
    "systemWriteMaxIOSize": 28.109400292908475,
    "systemReadMaxServiceTime": 0.35852122114027885,
    "systemWriteMaxServiceTime": 0.341677408795146
}
},
"cpuInfo": {
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    "cpuUserAvgPct": 4,
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    "cpuSysMaxPct": 19,
    "cpuUserMaxPct": 10,
    "cpuTotalMaxPct": 29,
    "byNode": [
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            "nodeId": "0",
            "cpuSysAvgPct": 15,
            "cpuUserAvgPct": 2,
            "cpuTotalAvgPct": 17
        },
        {
            "nodeId": "1",
            "cpuSysAvgPct": 15,
            "cpuUserAvgPct": 2,
            "cpuTotalAvgPct": 17
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            "cpuSysAvgPct": 16,
            "cpuUserAvgPct": 3,
            "cpuTotalAvgPct": 19
        },
        {
            "nodeId": "3",
            "cpuSysAvgPct": 19,
            "cpuUserAvgPct": 10,
            "cpuTotalAvgPct": 29
        }
    ]
}
]

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},
"pdInfo": {
  "pdReadAvgBandwidthMBPS": 1728.0827652655707,
  "pdWriteAvgBandwidthMBPS": 946.5405031670465,
  "pdReadAvgIOSizeKiB": 16.927944211978556,
  "pdWriteAvgIOSizeKiB": 15.04399594766344,
  "pdReadAvgServiceTimeMillis": 0.2544062997599878,
  "pdWriteAvgServiceTimeMillis": 0.32023361204336825,
  "pdReadIOPS": 104535.301944444445,
  "pdWriteIOPS": 64432.099444444444
},
"cmpInfo": {
  "byNode": [
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      "nodeId": 0,
      "availableCacheManagementPages": 7900655,
      "totalDataCache": 131072,
      "availableCmpPct": 94.18,
      "creditPct": 12.61
    },
    {
      "nodeId": 1,
      "availableCacheManagementPages": 7899184,
      "totalDataCache": 131072,
      "availableCmpPct": 94.16,
      "creditPct": 12.68
    },
    {
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      "availableCacheManagementPages": 7901130,
      "totalDataCache": 131072,
      "availableCmpPct": 94.18,
      "creditPct": 12.63
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    {
      "nodeId": 3,
      "availableCacheManagementPages": 7899949,
      "totalDataCache": 131072,
      "availableCmpPct": 94.17,
      "creditPct": 12.68
    }
  ]
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  "delAcksPctMetrics": {
    "rollingAvg7Days": 2.8299616333737207e-9
  },
  "portWriteAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.3034849641659288
  },
  "portWriteAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 329.8252565808617
  },
  "portReadAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.44022738676415896
  },
  "portReadAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 821.1716073473799
  }
},
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"port": {
  "readAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.44022738676415896
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  "writeAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.3034849641659288
  },
  "readAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 821.1716073473799
  },
  "writeAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 329.8252565808617
  },
  "readIOSizeKiBMetrics": {
    "rollingAvg7Days": 64.74355852404771
  },
  "writeIOSizeKiBMetrics": {
    "rollingAvg7Days": 24.935314870285833
  },
  "readIOPSMetrics": {
    "rollingAvg7Days": 13360.997426191658
  },
  "writeIOPSMetrics": {
    "rollingAvg7Days": 13354.103973296704
  }
},
"pd": {
  "readAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.2772247221106164
  },
  "writeAvgServiceTimeMillisMetrics": {
    "rollingAvg7Days": 0.3505930461175885
  },
  "readAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 1847.107687478946
  },
  "writeAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 995.6898712980059
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  "readIOSizeKiBMetrics": {
    "rollingAvg7Days": 16.865507054197703
  },
  "writeIOSizeKiBMetrics": {
    "rollingAvg7Days": 15.198624909866824
  },
  "readIOPSMetrics": {
    "rollingAvg7Days": 110512.45487094385
  },
  "writeIOPSMetrics": {
    "rollingAvg7Days": 65860.19605218971
  }
},
"cpuSysAvgPctMetrics": {
  "rollingAvg7Days": 13.839813057029543
},
"cpuSysMaxPctMetrics": {
  "rollingAvg7Days": 15.804243077323124
},
"cpu": {
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  },
  "cpuSysMaxPctMetrics": {
    "rollingAvg7Days": 15.804243077323124
  },
  "cpuUserAvgPctMetrics": {
    "rollingAvg7Days": 3.462404927842934
  },
  "cpuUserMaxPctMetrics": {
    "rollingAvg7Days": 8.017625722797359
  },
  "cpuTotalAvgPctMetrics": {
    "rollingAvg7Days": 17.61327670266167
  },
  "cpuTotalMaxPctMetrics": {
    "rollingAvg7Days": 23.7554959142244
  }
},
"byNode": [
  {
    "nodeId": "0",
    "cpuSysAvgPctMetrics": {
      "rollingAvg7Days": 13.546503854449131
    },
    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 2.020130468166288
    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 15.56663432261542
    }
  },
  {
    "nodeId": "1",
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 3.282070938621647
    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 16.658264526987647
    }
  },
  {
    "nodeId": "2",
    "cpuSysAvgPctMetrics": {
      "rollingAvg7Days": 14.194533873726824
    },
    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 4.413535124362286
    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 18.608068998089106
    }
  }
]
```



```

        "nodeId": "3",
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        "cpuUserAvgPctMetrics": {
            "rollingAvg7Days": 5.628073985531259
        },
        "cpuTotalAvgPctMetrics": {
            "rollingAvg7Days": 21.178329395581894
        }
    }
}
],
},
"maxVVWriteServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.1974534482063945
},
"maxVVReadServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.3649480237050033
}
},
"authorized": {
    "tenants": [
        "hp"
    ]
}
},
{
    "id": "CZ3739VXFS:2019-12-07T21:39:29Z",
    "systemId": "CZ3739VXFS",
    "timeRange": {
        "from": "2019-12-07T21:39:29Z",
        "to": "2019-12-08T01:39:30Z"
    },
    "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191207.161716.001.bz2",

"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191207.201718.001.bz2"

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    ],
    "delAcks": 0,
    "delAcksPct": 0,
    "vvInfo": {
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        "vvMaxWriteAvgServiceTimeMillis": 2.3500884731673,
        "vvReadIOPS": 8037.3242830359,
        "vvWriteIOPS": 11837.558433442122
    },
    "portInfo": {
        "portReadAvgBandwidthMBPS": 434.40604483439733,
        "portWriteAvgBandwidthMBPS": 267.59582016873827,
        "portReadAvgIOSizeKiB": 55.33201941844715,
        "portWriteAvgIOSizeKiB": 23.155245719571187,
        "portReadAvgServiceTimeMillis": 0.3135092548278702,
        "portWriteAvgServiceTimeMillis": 0.2838270478092373,
        "portReadIOPS": 8039.261995694744,
        "portWriteIOPS": 11834.202208179988,
        "portMin": {

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"portReadMinBandwidthMBPS": 18.985663294866676,
"portWriteMinBandwidthMBPS": 14.460632006349385,
"portReadMinIOSizeKiB": 49.180939691519434,
"portWriteMinIOSizeKiB": 21.79111811170032,
"portReadMinServiceTimeMillis": 0.27900553307144904,
"portWriteMinServiceTimeMillis": 0.2644479568283619,
"portReadMinIOPS": 384.7748073050483,
"portWriteMinIOPS": 617.2084577459899,
"portMinOutlierData": {
  "readBandwidthPortId": "2:4:2",
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  "readIOSizePortId": "2:4:1",
  "writeIOSizePortId": "3:5:2",
  "readServiceTimePortId": "0:4:1",
  "writeServiceTimePortId": "0:5:1",
  "readIOPSPortId": "3:4:2",
  "writeIOPSPortId": "3:4:2"
},
"portMax": {
  "portReadMaxBandwidthMBPS": 34.14607143302766,
  "portWriteMaxBandwidthMBPS": 18.18394294856911,
  "portReadMaxIOSizeKiB": 62.53135992910571,
  "portWriteMaxIOSizeKiB": 24.02758407471947,
  "portReadMaxServiceTimeMillis": 0.3346236982211762,
  "portWriteMaxServiceTimeMillis": 0.29720864031811867,
  "portReadMaxIOPS": 603.5426012082494,
  "portWriteMaxIOPS": 804.1539476425248,
  "portMaxOutlierData": {
    "readBandwidthPortId": "0:5:2",
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    "writeIOSizePortId": "2:4:2",
    "readServiceTimePortId": "1:5:2",
    "writeServiceTimePortId": "2:4:2",
    "readIOPSPortId": "2:5:1",
    "writeIOPSPortId": "2:5:1"
  }
},
"portAvg": {
  "portReadAvgBandwidthMBPS": 13.575188901074917,
  "portWriteAvgBandwidthMBPS": 8.362369380273071,
  "portReadAvgIOSizeKiB": 55.33201941844715,
  "portWriteAvgIOSizeKiB": 23.155245719571187,
  "portReadAvgServiceTimeMillis": 0.3135092548278702,
  "portWriteAvgServiceTimeMillis": 0.2838270478092373,
  "portReadAvgIOPS": 251.22693736546074,
  "portWriteAvgIOPS": 369.8188190056246
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"totalMax": {
  "systemReadMaxBandwidthMBPS": 262.4267578125,
  "systemWriteMaxBandwidthMBPS": 425.634765625,
  "systemReadMaxIOPS": 9279,
  "systemWriteMaxIOPS": 14831,
  "systemReadMaxIOSize": 62.53135992910571,
  "systemWriteMaxIOSize": 24.02758407471947,
  "systemReadMaxServiceTime": 0.3346236982211762,
  "systemWriteMaxServiceTime": 0.29720864031811867
}
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},
"cpuInfo": {
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  "cpuUserAvgPct": 2,
  "cpuTotalAvgPct": 12,
  "cpuSysMaxPct": 11,
  "cpuUserMaxPct": 4,
  "cpuTotalMaxPct": 15,
  "byNode": [
    {
      "nodeId": "0",
      "cpuSysAvgPct": 10,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 12
    },
    {
      "nodeId": "1",
      "cpuSysAvgPct": 10,
      "cpuUserAvgPct": 3,
      "cpuTotalAvgPct": 13
    },
    {
      "nodeId": "2",
      "cpuSysAvgPct": 9,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 11
    },
    {
      "nodeId": "3",
      "cpuSysAvgPct": 11,
      "cpuUserAvgPct": 4,
      "cpuTotalAvgPct": 15
    }
  ]
},
"pdInfo": {
  "pdReadAvgBandwidthMBPS": 1252.2489306365985,
  "pdWriteAvgBandwidthMBPS": 783.0065003352631,
  "pdReadAvgIOSizeKiB": 16.006377841654338,
  "pdWriteAvgIOSizeKiB": 14.209934323244912,
  "pdReadAvgServiceTimeMillis": 0.23487954793672564,
  "pdWriteAvgServiceTimeMillis": 0.24331029947628055,
  "pdReadIOPS": 80114.26178737587,
  "pdWriteIOPS": 56425.467120338864
},
"cmpInfo": {
  "byNode": [
    {
      "nodeId": 0,
      "availableCacheManagementPages": 7899015,
      "totalDataCache": 131072,
      "availableCmpPct": 94.16,
      "creditPct": 12.45
    },
    {
      "nodeId": 1,
      "availableCacheManagementPages": 7896854,
      "totalDataCache": 131072,
      "availableCmpPct": 94.13,
```

```

        "creditPct": 12.65
    },
    {
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        "totalDataCache": 131072,
        "availableCmpPct": 94.14,
        "creditPct": 12.63
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        "totalDataCache": 131072,
        "availableCmpPct": 94.16,
        "creditPct": 12.52
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    "portWriteAvgBandwidthMBPSMetrics": {
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    "portReadAvgServiceTimeMillisMetrics": {
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        "writeAvgServiceTimeMillisMetrics": {
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        "readAvgBandwidthMBPSMetrics": {
            "rollingAvg7Days": 823.6943713332265
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        "writeAvgBandwidthMBPSMetrics": {
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        },
        "readIOSizeKiBMetrics": {
            "rollingAvg7Days": 65.03655152485224
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        "writeIOSizeKiBMetrics": {
            "rollingAvg7Days": 24.941760998506115
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        "readIOPSMetrics": {
            "rollingAvg7Days": 13346.751510795855
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        "writeIOPSMetrics": {
            "rollingAvg7Days": 13358.766940145946
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},
"pd": {
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  "writeAvgServiceTimeMillisMetrics": {
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  "readAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 1849.9756207783023
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  "writeAvgBandwidthMBPSMetrics": {
    "rollingAvg7Days": 996.8741368021027
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  "readIOSizeKiBMetrics": {
    "rollingAvg7Days": 16.86400261629859
  },
  "writeIOSizeKiBMetrics": {
    "rollingAvg7Days": 15.20235073082517
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  "readIOPSMetrics": {
    "rollingAvg7Days": 110656.47576668972
  },
  "writeIOPSMetrics": {
    "rollingAvg7Days": 65894.60637348954
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"cpuSysMaxPctMetrics": {
  "rollingAvg7Days": 15.727240567892677
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    "cpuSysAvgPctMetrics": {
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    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 15.727240567892677
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    "cpuUserMaxPctMetrics": {
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    "cpuTotalAvgPctMetrics": {
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    "cpuTotalMaxPctMetrics": {
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  },
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    "cpuTotalAvgPctMetrics": {
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    }
},
{
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    "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 5.522731407136291
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    "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 20.989864415593974
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}
]
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"maxVVWriteServiceTimeMillisMetrics": {
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"maxVVReadServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.370778304158484
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},
"authorized": {
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        "hp"
    ]
}
}

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        "to": "2019-12-07T21:39:29Z"
      },
      "filenames": [
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        "/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191207.161716.001.bz2"
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      "delAcks": 0,
      "delAcksPct": 0,
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        "vvMaxWriteAvgServiceTimeMillis": 1.773695646583867,
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        "vvWriteIOPS": 10853.034724633655
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          "portWriteMinIOSizeKiB": 22.673995482296068,
          "portReadMinServiceTimeMillis": 0.2729596451119396,
          "portWriteMinServiceTimeMillis": 0.2504057088779755,
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          "portWriteMinIOPS": 558.6899784707272,
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            "writeServiceTimePortId": "0:5:1",
            "readIOPSPortId": "3:4:2",
            "writeIOPSPortId": "3:4:2"
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        }
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        "portWriteMaxIOSizeKiB": 25.106870011953472,
        "portReadMaxServiceTimeMillis": 0.3096358961474959,

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"portWriteMaxServiceTimeMillis": 0.2793522941888462,
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"portMaxOutlierData": {
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  "writeIOSizePortId": "2:4:2",
  "readServiceTimePortId": "1:5:2",
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  "readIOPSPortId": "2:5:1",
  "writeIOPSPortId": "2:5:1"
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  "systemWriteMaxIOPS": 11085,
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  "systemWriteMaxServiceTime": 0.2793522941888462
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  "cpuUserMaxPct": 5,
  "cpuTotalMaxPct": 14,
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      "cpuUserAvgPct": 3,
      "cpuTotalAvgPct": 11
    },
    {
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      "cpuSysAvgPct": 8,
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      "cpuTotalAvgPct": 10
    },
    {
      "nodeId": "2",
      "cpuSysAvgPct": 9,
      "cpuUserAvgPct": 5,
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        "cpuTotalAvgPct": 14
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        "nodeId": "3",
        "cpuSysAvgPct": 10,
        "cpuUserAvgPct": 3,
        "cpuTotalAvgPct": 13
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    "pdWriteAvgIOSizeKiB": 13.34619098290734,
    "pdReadAvgServiceTimeMillis": 0.2269737191543537,
    "pdWriteAvgServiceTimeMillis": 0.21174178142447422,
    "pdReadIOPS": 72274.04479477741,
    "pdWriteIOPS": 54863.770539620804
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            "totalDataCache": 131072,
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            "creditPct": 12.53
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            "totalDataCache": 131072,
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            "creditPct": 12.45
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            "totalDataCache": 131072,
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            "creditPct": 12.44
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            "totalDataCache": 131072,
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            "creditPct": 12.4
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  "writeAvgServiceTimeMillisMetrics": {
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  "writeIOPSMetrics": {
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}
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  "cpuSysMaxPctMetrics": {  
    "rollingAvg7Days": 15.841152537981703  
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        "rollingAvg7Days": 15.841152537981703  
      },  
      "cpuUserAvgPctMetrics": {  
        "rollingAvg7Days": 3.4843787745382317  
      },  
      "cpuUserMaxPctMetrics": {  
        "rollingAvg7Days": 8.065521376391798  
      },  
      "cpuTotalAvgPctMetrics": {  
        "rollingAvg7Days": 17.689644983527913  
      },  
      "cpuTotalMaxPctMetrics": {  
        "rollingAvg7Days": 23.837063838218313  
      }  
    },  
    "byNode": [  
      {  
        "nodeId": "0",  
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        },  
        "cpuUserAvgPctMetrics": {  
          "rollingAvg7Days": 2.0211122870909803  
        },  
        "cpuTotalAvgPctMetrics": {  
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        }  
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        "cpuSysAvgPctMetrics": {  
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        "cpuUserAvgPctMetrics": {  
          "rollingAvg7Days": 3.320504177502026  
        },  
        "cpuTotalAvgPctMetrics": {  
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        }  
      },  
      {  
        "nodeId": "2",  
        "cpuSysAvgPctMetrics": {  
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        "cpuUserAvgPctMetrics": {
            "rollingAvg7Days": 5.559424554441179
        },
        "cpuTotalAvgPctMetrics": {
            "rollingAvg7Days": 21.134201740159334
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    }
]
},
"maxVVWriteServiceTimeMillisMetrics": {
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"maxVVReadServiceTimeMillisMetrics": {
    "rollingAvg7Days": 2.379712921825253
}
},
"authorized": {
    "tenants": [
        "hp"
    ]
}
},
{
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        "from": "2019-12-07T13:39:29Z",
        "to": "2019-12-07T17:39:30Z"
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    "filenames": [
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        "/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191207.121716.0001.bz2"
    ],
    "delAcks": 0,
    "delAcksPct": 0,
    "vvInfo": {
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        "vvMaxWriteAvgServiceTimeMillis": 1.613319167971371,
        "vvReadIOPS": 8677.001666550934,
        "vvWriteIOPS": 12475.696132213041
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    "portInfo": {

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"portReadAvgBandwidthMBPS": 1096.7602963905501,
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"portReadAvgIOSizeKiB": 129.25083652166083,
"portWriteAvgIOSizeKiB": 18.55881686685865,
"portReadAvgServiceTimeMillis": 0.6282903864000715,
"portWriteAvgServiceTimeMillis": 0.24571002213458493,
"portReadIOPS": 8687.910492326922,
"portWriteIOPS": 12477.876883549754,
"portMin": {
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  "portReadMinServiceTimeMillis": 0.304211076659608,
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  "portWriteMinIOPS": 545.3187278661204,
  "portMinOutlierData": {
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    "readIOSizePortId": "1:4:1",
    "writeIOSizePortId": "0:5:1",
    "readServiceTimePortId": "0:4:1",
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    "readIOPSPortId": "3:4:2",
    "writeIOPSPortId": "3:4:2"
  }
},
"portMax": {
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  "portWriteMaxBandwidthMBPS": 15.379179871948997,
  "portReadMaxIOSizeKiB": 180.74935746034544,
  "portWriteMaxIOSizeKiB": 23.17155139589357,
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    "writeBandwidthPortId": "0:5:2",
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    "writeIOSizePortId": "2:4:2",
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    "readIOPSPortId": "1:5:2",
    "writeIOPSPortId": "2:5:1"
  }
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  "portWriteAvgIOSizeKiB": 18.55881686685865,
  "portReadAvgServiceTimeMillis": 0.6282903864000715,
  "portWriteAvgServiceTimeMillis": 0.24571002213458493,
  "portReadAvgIOPS": 271.4972028852163,
  "portWriteAvgIOPS": 389.9336526109298
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"totalMax": {
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    "systemWriteMaxIOPS": 11774,
    "systemReadMaxIOSize": 180.74935746034544,
    "systemWriteMaxIOSize": 23.17155139589357,
    "systemReadMaxServiceTime": 0.8480845999785496,
    "systemWriteMaxServiceTime": 0.2781261901072519
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},
"cpuInfo": {
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  "cpuUserAvgPct": 4,
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  "cpuSysMaxPct": 12,
  "cpuUserMaxPct": 10,
  "cpuTotalMaxPct": 22,
  "byNode": [
    {
      "nodeId": "0",
      "cpuSysAvgPct": 9,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 11
    },
    {
      "nodeId": "1",
      "cpuSysAvgPct": 9,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 11
    },
    {
      "nodeId": "2",
      "cpuSysAvgPct": 12,
      "cpuUserAvgPct": 10,
      "cpuTotalAvgPct": 22
    },
    {
      "nodeId": "3",
      "cpuSysAvgPct": 11,
      "cpuUserAvgPct": 5,
      "cpuTotalAvgPct": 16
    }
  ]
},
"pdInfo": {
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  "pdReadAvgIOSizeKiB": 16.943496458146235,
  "pdWriteAvgIOSizeKiB": 13.65124903677444,
  "pdReadAvgServiceTimeMillis": 0.21199762961736596,
  "pdWriteAvgServiceTimeMillis": 0.20406359194009419,
  "pdReadIOPS": 93903.89146587043,
  "pdWriteIOPS": 50273.83320602736
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"cmpInfo": {
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      "availableCacheManagementPages": 7896998,
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        "availableCmpPct": 94.13,
        "creditPct": 12.56
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        "totalDataCache": 131072,
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        "creditPct": 12.55
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        "availableCmpPct": 94.15,
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    "portWriteAvgBandwidthMBPSMetrics": {
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    "portReadAvgServiceTimeMillisMetrics": {
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        "writeAvgServiceTimeMillisMetrics": {
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        "readAvgBandwidthMBPSMetrics": {
            "rollingAvg7Days": 844.4151133682302
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        "writeAvgBandwidthMBPSMetrics": {
            "rollingAvg7Days": 333.66770822146304
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        "readIOSizeKiBMetrics": {
            "rollingAvg7Days": 65.56250922000882
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"readIOPSMetrics": {
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},
"writeIOPSMetrics": {
  "rollingAvg7Days": 13456.60642164343
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  "writeAvgServiceTimeMillisMetrics": {
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  "writeAvgBandwidthMBPSMetrics": {
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  "writeIOSizeKiBMetrics": {
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  "readIOPSMetrics": {
    "rollingAvg7Days": 112334.95011582371
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  "writeIOPSMetrics": {
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  "rollingAvg7Days": 15.981886581909283
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"cpu": {
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    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 15.981886581909283
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    "cpuUserMaxPctMetrics": {
      "rollingAvg7Days": 8.13938063913845
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    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 17.826728674090262
    }
  }
}
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        }
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    }
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"maxVVWriteServiceTimeMillisMetrics": {
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    ]
  }
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    "to": "2019-12-07T13:39:29Z"
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"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191207.081717.001.bz2"
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        "writeIOSizePortId": "0:5:1",
        "readServiceTimePortId": "2:4:1",
        "writeServiceTimePortId": "0:5:1",
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    "portWriteMaxServiceTimeMillis": 0.42156106389424197,
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    "portWriteMaxIOPS": 1594.8593087140969,
    "portMaxOutlierData": {
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        "readIOSizePortId": "1:5:1",
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        "writeIOPSPortId": "2:5:1"
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    {

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    "cpuUserAvgPct": 2,
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    "cpuUserAvgPct": 9,
    "cpuTotalAvgPct": 41
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  "pdWriteAvgIOSizeKiB": 17.87930611470131,
  "pdReadAvgServiceTimeMillis": 0.3351677068156182,
  "pdWriteAvgServiceTimeMillis": 0.5259267033522572,
  "pdReadIOPS": 160416.96244523264,
  "pdWriteIOPS": 90835.65616524097
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      "creditPct": 14.03
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      "creditPct": 14.04
    }
  ]
}
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    "writeAvgBandwidthMBPSMetrics": {
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}
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  "cpu": {
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      "cpuSysMaxPctMetrics": {
        "rollingAvg7Days": 16.077837811532984
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      "cpuUserAvgPctMetrics": {
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      "cpuUserMaxPctMetrics": {
        "rollingAvg7Days": 8.094545430534712
      },
      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 17.89484414812807
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      "cpuTotalMaxPctMetrics": {
        "rollingAvg7Days": 24.1240523301422
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        "cpuTotalAvgPctMetrics": {
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        "cpuUserAvgPctMetrics": {
          "rollingAvg7Days": 3.3849065493162955
        }
      }
    ]
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}
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      "rollingAvg7Days": 4.362024558350258
    },
    "cpuTotalAvgPctMetrics": {
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    "nodeId": "3",
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    },
    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 5.636056516999473
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    }
  }
]
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}
},
"authorized": {
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    "hp"
  ]
}
},
{
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    "from": "2019-12-07T05:39:28Z",
    "to": "2019-12-07T09:39:50Z"
  },
  "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191207.041746.001.bz2"

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  "vvWriteIOPS": 14570.729787824157
},
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      "writeIOSizePortId": "1:5:1",
      "readServiceTimePortId": "2:4:1",
      "writeServiceTimePortId": "0:5:1",
      "readIOPSPortId": "3:4:2",
      "writeIOPSPortId": "3:4:2"
    }
  }
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"portAvg": {
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  "cpuUserMaxPct": 10,
  "cpuTotalMaxPct": 21,
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    {
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      "cpuUserAvgPct": 4,
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  "pdReadAvgIOSizeKiB": 17.477070425301672,
  "pdWriteAvgIOSizeKiB": 15.26549773994905,
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      "creditPct": 12.41
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    {
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      "totalDataCache": 131072,
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      "creditPct": 12.39
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  "portReadAvgServiceTimeMillisMetrics": {
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  },
  "portReadAvgBandwidthMBPSMetrics": {
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    "writeAvgServiceTimeMillisMetrics": {
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"writeIOPSMetrics": {
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"pd": {
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  "writeAvgBandwidthMBPSMetrics": {
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  "writeIOSizeKiBMetrics": {
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  "readIOPSMetrics": {
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  "writeIOPSMetrics": {
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    "cpuUserMaxPctMetrics": {
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    "cpuTotalAvgPctMetrics": {
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    "cpuTotalMaxPctMetrics": {
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    }
  },
  "byNode": [
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      "cpuUserAvgPctMetrics": {
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    "maxVVReadServiceTimeMillisMetrics": {
        "rollingAvg7Days": 2.4023611391881334
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},
"authorized": {
    "tenants": [
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    ]
}
},
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        "to": "2019-12-07T05:39:28Z"
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    "filenames": [
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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191207.001716.0001.bz2"
    ],
    "delAcks": 0,
    "delAcksPct": 0,
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        "vvMaxWriteAvgServiceTimeMillis": 2.9714234867138907,
        "vvReadIOPS": 9587.376015554475,
        "vvWriteIOPS": 10913.366363446983
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        "portWriteAvgIOSizeKiB": 25.617078920132773,
        "portReadAvgServiceTimeMillis": 0.3358154990523849,
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        "portReadIOPS": 9581.357266856468,
        "portWriteIOPS": 10914.776265537115,
        "portMin": {
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            "portWriteMinBandwidthMBPS": 14.589128569359334,
            "portReadMinIOSizeKiB": 53.83595351912199,
            "portWriteMinIOSizeKiB": 23.992368301289247,
            "portReadMinServiceTimeMillis": 0.30357539965258046,
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            "portReadMinIOPS": 432.98201513783766,

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"portWriteMinIOPS": 558.1367960558294,
"portMinOutlierData": {
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  "readIOSizePortId": "3:4:1",
  "writeIOSizePortId": "3:5:2",
  "readServiceTimePortId": "0:4:1",
  "writeServiceTimePortId": "0:5:1",
  "readIOPSPortId": "3:4:2",
  "writeIOPSPortId": "3:4:2"
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"portMax": {
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  "portReadMaxIOSizeKiB": 70.29617197955814,
  "portWriteMaxIOSizeKiB": 26.96150537559689,
  "portReadMaxServiceTimeMillis": 0.35405038557664703,
  "portWriteMaxServiceTimeMillis": 0.30393305799218806,
  "portReadMaxIOPS": 797.5703770571488,
  "portWriteMaxIOPS": 765.5335046177349,
  "portMaxOutlierData": {
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    "readIOSizePortId": "2:5:2",
    "writeIOSizePortId": "0:4:2",
    "readServiceTimePortId": "1:5:2",
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    "readIOPSPortId": "3:4:1",
    "writeIOPSPortId": "0:5:2"
  }
},
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  "portReadAvgIOSizeKiB": 62.463487003056045,
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  "portReadAvgServiceTimeMillis": 0.3358154990523849,
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  "cpuUserAvgPct": 3,
  "cpuTotalAvgPct": 12,
  "cpuSysMaxPct": 10,
  "cpuUserMaxPct": 6,
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    "cpuUserAvgPct": 2,
    "cpuTotalAvgPct": 11
  },
  {
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    "cpuSysAvgPct": 8,
    "cpuUserAvgPct": 2,
    "cpuTotalAvgPct": 10
  },
  {
    "nodeId": "2",
    "cpuSysAvgPct": 10,
    "cpuUserAvgPct": 6,
    "cpuTotalAvgPct": 16
  },
  {
    "nodeId": "3",
    "cpuSysAvgPct": 10,
    "cpuUserAvgPct": 3,
    "cpuTotalAvgPct": 13
  }
]
},
"pdInfo": {
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  "pdWriteAvgBandwidthMBPS": 753.7407375071067,
  "pdReadAvgIOSizeKiB": 16.472844090647865,
  "pdWriteAvgIOSizeKiB": 14.115411833986856,
  "pdReadAvgServiceTimeMillis": 0.23487907739793232,
  "pdWriteAvgServiceTimeMillis": 0.2612209540974988,
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  "pdWriteIOPS": 54672.09402124852
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"cmpInfo": {
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      "totalDataCache": 131072,
      "availableCmpPct": 94.15,
      "creditPct": 12.62
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    {
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      "totalDataCache": 131072,
      "availableCmpPct": 94.15,
      "creditPct": 12.51
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    {
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      "totalDataCache": 131072,
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        "creditPct": 12.65
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        "availableCmpPct": 94.15,
        "creditPct": 12.59
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    "portWriteAvgBandwidthMBPSMetrics": {
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    "portReadAvgServiceTimeMillisMetrics": {
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        "writeAvgBandwidthMBPSMetrics": {
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        },
        "readIOSizeKiBMetrics": {
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        "writeIOSizeKiBMetrics": {
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        "readIOPSMetrics": {
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    "pd": {
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        "writeAvgServiceTimeMillisMetrics": {
            "rollingAvg7Days": 0.3575357411973942
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}
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    "writeIOSizeKiBMetrics": {
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    "readIOPSMetrics": {
      "rollingAvg7Days": 111422.13265610818
    },
    "writeIOPSMetrics": {
      "rollingAvg7Days": 66260.29512508302
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  "cpuSysAvgPctMetrics": {
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  "cpuSysMaxPctMetrics": {
    "rollingAvg7Days": 15.80805188845214
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  "cpu": {
    "total": {
      "nodeId": "total",
      "cpuSysAvgPctMetrics": {
        "rollingAvg7Days": 13.85022889205109
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      "cpuSysMaxPctMetrics": {
        "rollingAvg7Days": 15.80805188845214
      },
      "cpuUserAvgPctMetrics": {
        "rollingAvg7Days": 3.4833744390842742
      },
      "cpuUserMaxPctMetrics": {
        "rollingAvg7Days": 8.026251406318405
      },
      "cpuTotalAvgPctMetrics": {
        "rollingAvg7Days": 17.59250843744284
      },
      "cpuTotalMaxPctMetrics": {
        "rollingAvg7Days": 23.783615149839626
      }
    },
    "byNode": [
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        "nodeId": "0",
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        },
        "cpuUserAvgPctMetrics": {
          "rollingAvg7Days": 1.99734433415731
        },
        "cpuTotalAvgPctMetrics": {
          "rollingAvg7Days": 15.561634607943327
        }
      }
    ]
  }
}
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    "cpuUserAvgPctMetrics": {
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      "rollingAvg7Days": 16.627725874422282
    }
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  {
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 4.453094579581171
    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 18.66260114657981
    }
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    },
    "cpuUserAvgPctMetrics": {
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    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 21.1329819069407
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  }
]
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"maxVVWriteServiceTimeMillisMetrics": {
  "rollingAvg7Days": 2.227239936715264
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"maxVVReadServiceTimeMillisMetrics": {
  "rollingAvg7Days": 2.3931643215445164
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},
"authorized": {
  "tenants": [
    "hp"
  ]
}
},
{
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  "systemId": "CZ3739VXFS",
  "timeRange": {
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    "to": "2019-12-07T01:39:27Z"
  }
}

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    },
    "filenames": [

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"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191206.201721.0001.bz2"
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    "delAcks": 0,
    "delAcksPct": 0,
    "vvInfo": {
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        "vvMaxWriteAvgServiceTimeMillis": 2.619627757881503,
        "vvReadIOPS": 9484.26875,
        "vvWriteIOPS": 11022.01673611111
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    "portInfo": {
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        "portWriteAvgBandwidthMBPS": 290.6683412000868,
        "portReadAvgIOSizeKiB": 114.75988307919101,
        "portWriteAvgIOSizeKiB": 27.01975832854497,
        "portReadAvgServiceTimeMillis": 0.9817005791068478,
        "portWriteAvgServiceTimeMillis": 0.3209838611061385,
        "portReadIOPS": 9485.883819444445,
        "portWriteIOPS": 11017.623541666666,
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            "portReadMinIOSizeKiB": 47.564766860274254,
            "portWriteMinIOSizeKiB": 25.69484396035212,
            "portReadMinServiceTimeMillis": 0.27931093515522487,
            "portWriteMinServiceTimeMillis": 0.2955296996936085,
            "portReadMinIOPS": 343.9382638888889,
            "portWriteMinIOPS": 560.3732638888889,
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                "writeServiceTimePortId": "0:5:1",
                "readIOPSPortId": "2:4:2",
                "writeIOPSPortId": "3:4:2"
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        }
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        "portReadMaxIOSizeKiB": 145.114478626227,
        "portWriteMaxIOSizeKiB": 28.12641449529747,
        "portReadMaxServiceTimeMillis": 1.3802012581770708,
        "portWriteMaxServiceTimeMillis": 0.33422679111078624,
        "portReadMaxIOPS": 816.3449305555556,
        "portWriteMaxIOPS": 757.7402777777778,
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        "writeIOSizePortId": "3:4:2",
        "readServiceTimePortId": "0:4:2",
        "writeServiceTimePortId": "1:4:2",
        "readIOPSPortId": "1:5:2",
        "writeIOPSPortId": "0:5:2"
    }
},
"portAvg": {
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    "portWriteAvgIOPS": 344.3007356770833
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    "systemWriteMaxIOSize": 28.12641449529747,
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},
"cpuInfo": {
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    "cpuUserAvgPct": 4,
    "cpuTotalAvgPct": 17,
    "cpuSysMaxPct": 14,
    "cpuUserMaxPct": 10,
    "cpuTotalMaxPct": 24,
    "byNode": [
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            "cpuUserAvgPct": 2,
            "cpuTotalAvgPct": 14
        },
        {
            "nodeId": "1",
            "cpuSysAvgPct": 14,
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            "cpuSysAvgPct": 12,
            "cpuUserAvgPct": 2,
            "cpuTotalAvgPct": 14
        },
        {
            "nodeId": "3",
            "cpuSysAvgPct": 14,
            "cpuUserAvgPct": 4,
            "cpuTotalAvgPct": 18
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    ]
}
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    }
  ]
},
"pdInfo": {
  "pdReadAvgBandwidthMBPS": 1679.9970577663846,
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  "pdReadAvgIOSizeKiB": 17.13048092266418,
  "pdWriteAvgIOSizeKiB": 14.42010760369305,
  "pdReadAvgServiceTimeMillis": 0.2578591579702226,
  "pdWriteAvgServiceTimeMillis": 0.30583233096153756,
  "pdReadIOPS": 100442.44118055556,
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},
"cmpInfo": {
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      "totalDataCache": 131072,
      "availableCmpPct": 94.15,
      "creditPct": 12.56
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    {
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      "availableCacheManagementPages": 7897447,
      "totalDataCache": 131072,
      "availableCmpPct": 94.14,
      "creditPct": 12.5
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    {
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      "availableCacheManagementPages": 7899405,
      "totalDataCache": 131072,
      "availableCmpPct": 94.16,
      "creditPct": 12.65
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      "creditPct": 12.63
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  "portReadAvgServiceTimeMillisMetrics": {
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  "portReadAvgBandwidthMBPSMetrics": {

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    "writeAvgBandwidthMBPSMetrics": {
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    "readIOSizeKiBMetrics": {
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    "writeIOSizeKiBMetrics": {
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    "writeAvgServiceTimeMillisMetrics": {
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    "writeAvgBandwidthMBPSMetrics": {
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    "writeIOSizeKiBMetrics": {
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}
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  ]
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    "to": "2019-12-06T21:39:27Z"
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"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191206.161716.001.bz2"
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    "writeIOSizePortId": "0:5:1",
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    "readIOPSPortId": "3:4:2",
    "writeIOPSPortId": "3:4:2"
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    "cpuTotalAvgPct": 15,
    "cpuSysMaxPct": 13,
    "cpuUserMaxPct": 6,
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        "creditPct": 12.58
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    "portWriteAvgBandwidthMBPSMetrics": {
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        "writeIOSizeKiBMetrics": {
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        "writeIOPSMetrics": {
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            "cpuSysMaxPctMetrics": {
                "rollingAvg7Days": 15.994945799741656
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            "cpuUserAvgPctMetrics": {
                "rollingAvg7Days": 3.4828547214152334
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            "cpuUserMaxPctMetrics": {
                "rollingAvg7Days": 8.028696389142997
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            "cpuTotalMaxPctMetrics": {
                "rollingAvg7Days": 23.97048184213808
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    "cpuTotalAvgPctMetrics": {
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    "/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191206.121716.001.bz2"
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  "delAcks": 0,
  "delAcksPct": 0,
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        "readIOPSPortId": "3:4:2",
        "writeIOPSPortId": "3:4:2"
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    "portReadMaxIOSizeKiB": 60.227209587144436,

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"portWriteMaxIOSizeKiB": 19.817888668856238,
"portReadMaxServiceTimeMillis": 0.3150056733435865,
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"portReadMaxIOPS": 928.9496562738699,
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  "readIOPSPortId": "2:4:1",
  "writeIOPSPortId": "2:5:1"
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  "cpuTotalMaxPct": 22,
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    {
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      "cpuTotalAvgPct": 22
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    {
      "nodeId": "2",
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        "cpuSysAvgPct": 12,
        "cpuUserAvgPct": 5,
        "cpuTotalAvgPct": 17
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]
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    "pdReadAvgIOSizeKiB": 15.815866664593297,
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            "totalDataCache": 131072,
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            "creditPct": 12.56
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            "totalDataCache": 131072,
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            "creditPct": 12.58
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    "writeIOPSMetrics": {
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    "writeAvgServiceTimeMillisMetrics": {
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    "readIOSizeKiBMetrics": {
      "rollingAvg7Days": 16.91432733555075
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    "writeIOSizeKiBMetrics": {
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    "readIOPSMetrics": {
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  "rollingAvg7Days": 16.06711478954843
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    "cpuSysMaxPctMetrics": {
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    "cpuTotalMaxPctMetrics": {
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      "cpuUserAvgPctMetrics": {
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      "cpuTotalAvgPctMetrics": {
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        "cpuTotalAvgPctMetrics": {
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    }
]
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"maxVVReadServiceTimeMillisMetrics": {
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},
"authorized": {
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    ]
}
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    },
    "filenames": [
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"/share/st5208/prod/data/files//3PAR.INSERTV/CZ3739VXFS/perform/perform.191206.081716.001.bz2"
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    "delAcks": 0,
    "delAcksPct": 0,
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        "vvMaxWriteAvgServiceTimeMillis": 2.6511886676532836,
        "vvReadIOPS": 13686.196692836797,
        "vvWriteIOPS": 15456.528590286945
    }
}

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  "portReadAvgIOSizeKiB": 56.30580748250894,
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  "portWriteIOPS": 15471.249218370041,
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    "portReadMinIOSizeKiB": 51.060044926587544,
    "portWriteMinIOSizeKiB": 20.67638008387382,
    "portReadMinServiceTimeMillis": 0.3628073059271582,
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      "writeBandwidthPortId": "3:4:2",
      "readIOSizePortId": "2:4:1",
      "writeIOSizePortId": "0:4:1",
      "readServiceTimePortId": "0:4:1",
      "writeServiceTimePortId": "0:5:1",
      "readIOPSPortId": "3:4:2",
      "writeIOPSPortId": "3:4:2"
    }
  }
},
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  "portReadMaxIOSizeKiB": 66.68765395573118,
  "portWriteMaxIOSizeKiB": 29.599167559466707,
  "portReadMaxServiceTimeMillis": 0.4418652939039948,
  "portWriteMaxServiceTimeMillis": 0.3765905789272321,
  "portReadMaxIOPS": 1264.2636003612868,
  "portWriteMaxIOPS": 1127.8493712221218,
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    "readIOPSPortId": "2:4:1",
    "writeIOPSPortId": "2:5:1"
  }
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  "portReadAvgIOSizeKiB": 56.30580748250894,
  "portWriteAvgIOSizeKiB": 25.482749038572333,
  "portReadAvgServiceTimeMillis": 0.41516453967349387,
  "portWriteAvgServiceTimeMillis": 0.3270244950223797,
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  "portWriteAvgIOPS": 483.4765380740638
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      "systemWriteMaxIOPS": 11686,
      "systemReadMaxIOSize": 66.68765395573118,
      "systemWriteMaxIOSize": 29.599167559466707,
      "systemReadMaxServiceTime": 0.4418652939039948,
      "systemWriteMaxServiceTime": 0.3765905789272321
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  },
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    "cpuUserAvgPct": 4,
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    "cpuSysMaxPct": 17,
    "cpuUserMaxPct": 10,
    "cpuTotalMaxPct": 27,
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        "cpuUserAvgPct": 2,
        "cpuTotalAvgPct": 16
      },
      {
        "nodeId": "1",
        "cpuSysAvgPct": 14,
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        "cpuUserAvgPct": 4,
        "cpuTotalAvgPct": 20
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    "pdReadAvgIOSizeKiB": 17.254823083465052,
    "pdWriteAvgIOSizeKiB": 16.482189135962425,
    "pdReadAvgServiceTimeMillis": 0.30543826773234867,
    "pdWriteAvgServiceTimeMillis": 0.43460004345608005,
    "pdReadIOPS": 123326.1473633016,
    "pdWriteIOPS": 71958.17188911277
  },
  "cmpInfo": {
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        "creditPct": 12.59
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        "creditPct": 12.7
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        "totalDataCache": 131072,
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        "creditPct": 12.73
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    "portWriteAvgBandwidthMBPSMetrics": {
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    "portReadAvgServiceTimeMillisMetrics": {
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        "writeAvgServiceTimeMillisMetrics": {
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        "readIOSizeKiBMetrics": {

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  "writeIOSizeKiBMetrics": {
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  "readIOPSMetrics": {
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  "writeIOPSMetrics": {
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  "writeIOSizeKiBMetrics": {
    "rollingAvg7Days": 15.35796346020255
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  "readIOPSMetrics": {
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  "writeIOPSMetrics": {
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"cpuSysMaxPctMetrics": {
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    "cpuSysMaxPctMetrics": {
      "rollingAvg7Days": 16.165119757055766
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    "cpuUserAvgPctMetrics": {
      "rollingAvg7Days": 3.482308799699704
    },
    "cpuUserMaxPctMetrics": {
      "rollingAvg7Days": 8.03125736538712
    }
  },
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"cpuTotalAvgPctMetrics": {
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},
"cpuTotalMaxPctMetrics": {
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    },
    "cpuTotalAvgPctMetrics": {
      "rollingAvg7Days": 15.892875347876176
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]
},
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},
"authorized": {
    "tenants": [
        "hp"
    ]
}
},
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        "to": "2019-12-06T09:39:32Z"
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"/share/st5208/prod/data/files//3PAR.INSERV/CZ3739VXFS/perform/perform.191206.041726.001.bz2"
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    "delAcks": 0,
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                "writeBandwidthPortId": "3:4:2",
                "readIOSizePortId": "3:4:1",
                "writeIOSizePortId": "0:5:1",
                "readServiceTimePortId": "2:4:1",

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        "writeServiceTimePortId": "0:5:1",
        "readIOPSPortId": "3:4:2",
        "writeIOPSPortId": "3:4:2"
    }
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    "portReadMaxIOSizeKiB": 119.2337753477212,
    "portWriteMaxIOSizeKiB": 31.37644942677494,
    "portReadMaxServiceTimeMillis": 0.669222448523256,
    "portWriteMaxServiceTimeMillis": 0.39896454822919375,
    "portReadMaxIOPS": 1691.6097036162976,
    "portWriteMaxIOPS": 1407.0612896508642,
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        "readIOPSPortId": "2:4:1",
        "writeIOPSPortId": "2:5:1"
    }
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    "systemReadMaxIOSize": 119.2337753477212,
    "systemWriteMaxIOSize": 31.37644942677494,
    "systemReadMaxServiceTime": 0.669222448523256,
    "systemWriteMaxServiceTime": 0.39896454822919375
}
},
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    "cpuUserAvgPct": 3,
    "cpuTotalAvgPct": 26,
    "cpuSysMaxPct": 25,
    "cpuUserMaxPct": 7,
    "cpuTotalMaxPct": 32,
    "byNode": [
        {
            "nodeId": "0",
            "cpuSysAvgPct": 22,
            "cpuUserAvgPct": 2,
            "cpuTotalAvgPct": 24
        }
    ]
}

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      "cpuSysAvgPct": 22,
      "cpuUserAvgPct": 2,
      "cpuTotalAvgPct": 24
    },
    {
      "nodeId": "3",
      "cpuSysAvgPct": 25,
      "cpuUserAvgPct": 7,
      "cpuTotalAvgPct": 32
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  ]
},
"pdInfo": {
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  "pdReadAvgIOSizeKiB": 17.65788449692553,
  "pdWriteAvgIOSizeKiB": 16.690132326981615,
  "pdReadAvgServiceTimeMillis": 0.40255999080650795,
  "pdWriteAvgServiceTimeMillis": 0.6270765115525107,
  "pdReadIOPS": 167991.18546539877,
  "pdWriteIOPS": 92888.57395710419
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"cmpInfo": {
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      "totalDataCache": 131072,
      "availableCmpPct": 94.25,
      "creditPct": 13
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    {
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      "totalDataCache": 131072,
      "availableCmpPct": 94.27,
      "creditPct": 12.97
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      "totalDataCache": 131072,
      "availableCmpPct": 94.26,
      "creditPct": 13.01
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    {
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      "totalDataCache": 131072,
      "availableCmpPct": 94.27,
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        "creditPct": 13.06
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]
},
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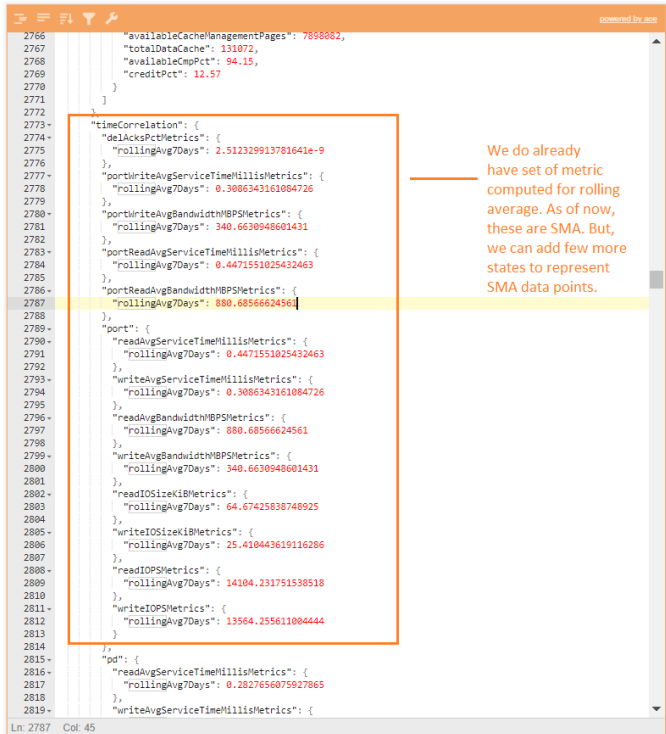
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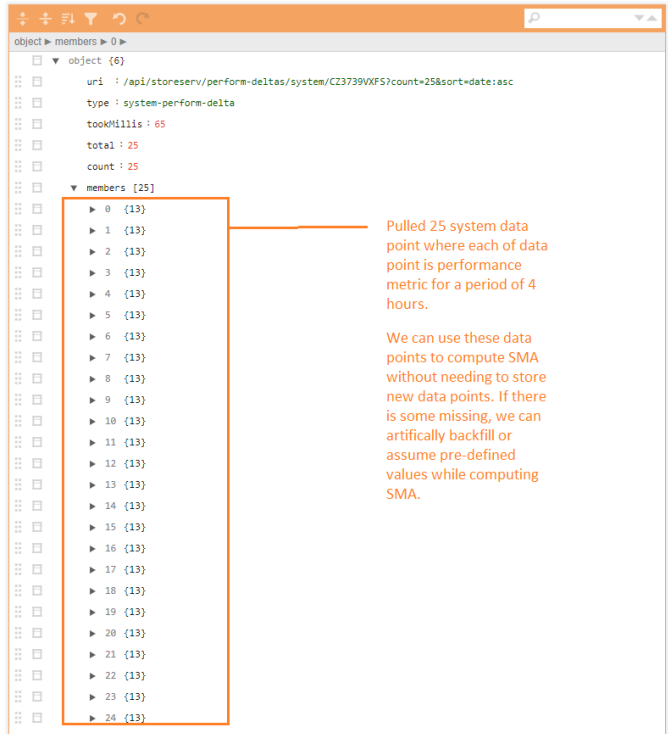
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Data points (available as well new one) for computing simple moving average

As we can see from below that every 4 hours set is already storing 7 days average. We can extend same bucket to add new field for 24 hour Rolling Simple Moving Average (SMA). Also, the same can be compute using performance delta which is already being persisted for sufficient duration to compute the result.



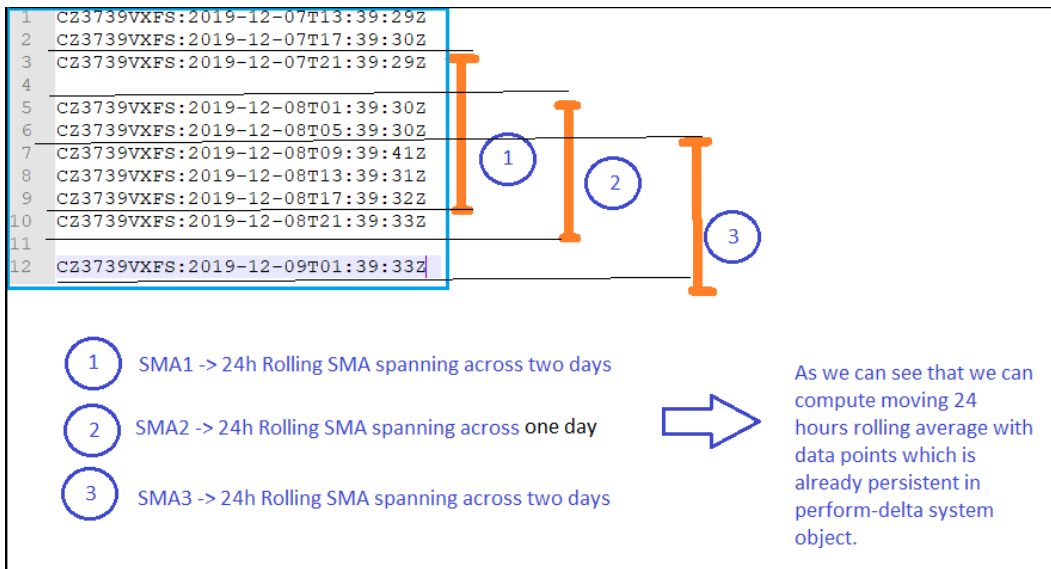
We do already have set of metric computed for rolling average. As of now, these are SMA. But, we can add few more states to represent SMA data points.



Pulled 25 system data point where each of data point is performance metric for a period of 4 hours.

We can use these data points to compute SMA without needing to store new data points. If there is some missing, we can artificially backfill or assume pre-defined values while computing SMA.

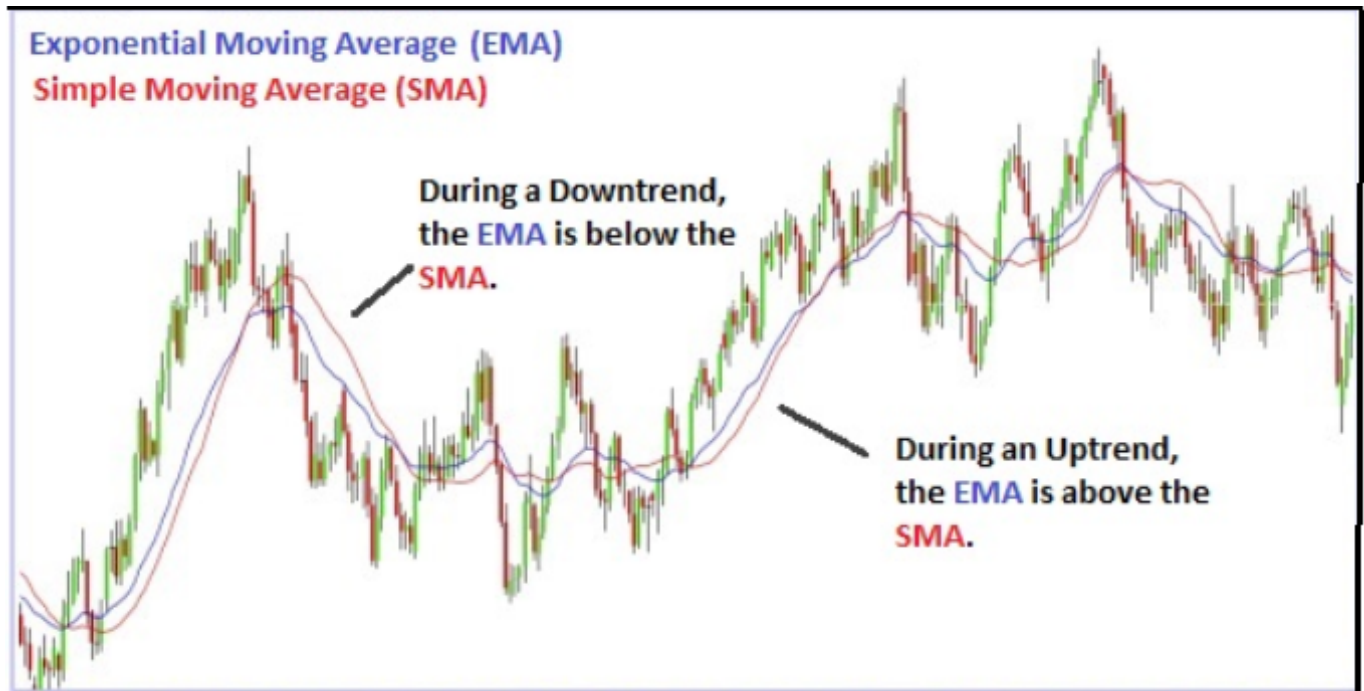
Algorithm to compute Simple Moving Average (SMA)



Reconciled and correlated view of performance averages

As we are done with computation of both SMA and EMA, we can plot following 3 values together to get a sense of performance trend as illustrated below.

- 4 hour average
- Rolling 24 hour SMA
- Rolling 24 hour EMA



The same applies to 7 days rolling averages.

