

BVQ^o

**Three steps to ensure you meet the
SLAs with a Global Mirror with
Change Volume Implementation**

For IBM Spectrum Virtualize Storage



EXECUTIVE SUMMARY

You can make sure your disaster recovery plan is successful when implementing Global Mirror with Change Volume on IBM Spectrum Virtualize Storage.

You can do this by configuring Global Mirror with Change Volumes (GMCV) to produce consistent copies on the backup side that meet the Recovery Point objectives that can be used to restore data in the event of a disaster.

Implementing GMCV can be an alternative solution to Global Mirror because it offers two attractive benefits: **host write performance is not affected by link bandwidth constraints and the Recovery Point Objective (RPO) can be tuned to meet the available and existing bandwidth.** The tunable RPO is called the cycle period and is the main setting the storage administrator needs to configure. The time the cycle period takes to complete, determines the RPO that can be guaranteed.

Not knowing the RPO that can be met on a consistent basis, can jeopardize your business' disaster recovery plan. In case you have already determined an RPO for your most critical applications, it is important to be sure this RPO can be met on a consistent basis and that it aligns with the DR plan.

This white paper will discuss the challenges administrators encounter and what information is important to gain insight and understanding of how the replication is behaving specific to your environment. Most importantly, as you read you will learn that the right tool is now available to monitor the GMCV implementation and you will discover how easy it is to find the RPO that you can guarantee on a consistent basis.

UNIQUE CONFIGURATION PARAMETER IN A GMCV IMPLEMENTATION

The configurable parameter in GMCV is the cycle period and the period it is set to needs to fit the load of the replication and the existing bandwidth.

The copy cycle has several steps and these repeat over and over based on the configurable cycle period. The cycle period can be set to as low as 5 mins and up to 24 hours.

Sometimes the copy operation does not complete within the cycle period because there is not sufficient bandwidth available, or a volume/set of volumes experience a high load. When there is a high load of data; it creates a big amount of changes that needs to be copied to the remote site. GMCV allows the copy to take as long as needed to complete, then the next cycle will start once the previous one finishes. This will increase the Recovery Point. This presents a problem because it could be that the RPO that has been guaranteed, cannot be met.

STORAGE ADMINISTRATORS' CHALLENGES

Challenge 1: Setting the appropriate cycle period parameter that fits the characteristic of your environment - How do you know which cycle to set?

The RPO that can be stated for the most critical applications when using GMCV, is determined based on how long the cycle period takes to complete. Unfortunately, many times the administrator makes a guess on the period to set the replication cycle, and this becomes the RPO the administrator is hoping for. More often than not, the administrator just hopes for the best.

Therefore, the storage administrator's biggest challenge is figuring out how long the copy to the remote site takes to complete for peak periods. This insight is needed for each consistency group; to then be able to set a more accurate cycle period for each.

It is important to see what is going on with the replication to gain insight about the variations and learn at which periods during the day or even which periods during the week the RPO can be met. To accomplish this, the storage administrator needs the right tool that provides insight on how the cycle period is behaving.

Challenge 2: Monitoring hundreds of consistency groups and determining quickly for each, which is falling behind

In large environments, there could be hundreds of consistency groups; and it becomes necessary to quickly be able to determine which consistency group is falling behind and when there is a good copy of the data to recover from in case of a disaster. Monitoring hundreds of consistency groups can become almost impossible with some of the tools available in the market.

When dealing with a large environment, it is imperative to have a visual to quickly glance and see what is going on with the replication and determine which consistency groups did not meet the RPO during a selected period. Not only that, but understand; how often and when the RPO is missed, and the time period the copy cycle was exceeded.

Challenge 3: Figuring out what caused the missed RPO

Another challenge that is presented is figuring out what went wrong. For this, there are three areas that are important to check. First, check to see if the replication is creating a high load due to the characteristic of the workload and behavior of the copy process.

Second, see if there's a sporadic spike of high load coming from a volume or set of volumes that could be interfering with the copy operation process.

Third, check for bandwidth problems and determine if the size of the link might not be sufficient to handle the load.

These challenges are present today because the administrators lack the right tools to perform their day to day functions in an efficient manner. The tools today lack:

- A warning to notify the copy operation did not finish within the cycle period; which will indicate an increase in RPO.
- There is no easy and quick way to check if the RPO is increasing on the consistency groups.
- A view into what is going on with the replication.
- Another challenge is lack of a quick way to pinpoint what is preventing the GMCV operation from completing within the set period of time.

BVQ HAS THE SOLUTION TO HELP SIMPLIFY REPLICATION MONITORING IN A GMCV ENVIRONMENT WITH WEB INTERFACE MONITORING DASHBOARDS

BVQ was designed exclusively with the Spectrum Virtualize Storage in mind; therefore, it is the product that can help you implement GMCV to have a successful DR plan. BVQ offers three Web Interface Monitoring Dashboards to give you the insight you need. The Dashboards are accessible from anywhere and can be accessed by anyone on the team.

THREE DASHBOARDS THAT HELP SUCCESSFULLY MONITOR GMCV

BVQ offers three specialized dashboards:

Dashboard 1 GMCV Overview: Identify immediately which consistency group is in trouble; which consistency group did not meet the RPO 100% of the time during a monitored period.

Dashboard 2 GMCV Week: Shows how the copy operation is behaving for each Consistency Group over a period of 7days, indicates when the RPO was not met, how often, and how long it was exceeded by.

Dashboard 3 GMCV Analysis: Helps identify which volume prevented the cycle from completing within the cycle period and helps understand the characteristics of the workload that provides insight to help tune the cycle period to fit the replication load and the existing bandwidth.

THREE STEPS TO A SUCCESSFUL GMCV IMPLEMENTATION

Step 1 Use Dashboard “GMCV Overview” - Helps answer this question:

✓ **Which consistency groups did not meet the RPO during a selected period?**

This dashboard displays the overview of all consistency groups in a single heatmap view allowing the administrator to quickly determine which consistency group is in trouble.

For each consistency group, you can see the status of the quality of the RPO in a traffic light display as green for good, orange for warning or red for error and the % RPO met. The indicator **RPO % met**, is the percentage of time indicating how often the cycle was met successfully over a selected time period.

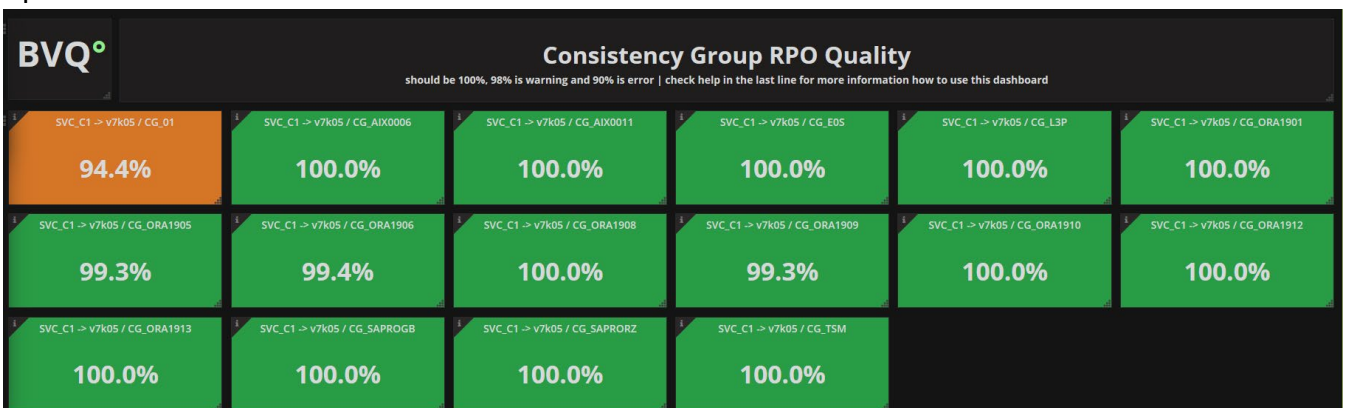


Figure 1. Displays status of each consistency group in a heatmap. Status of good, warning and error are shown for each consistency group

The above heatmap overview is informing that for Consistency Group CG_01, all expected recovery points have been formed 96.4% of the time. The acceptable percentage level ratings are adjusted based on the customer's requirements. The current setting rates are between 98% and 100% as status good (green), from 70% to 98% as warning (orange) and below 70% as error (red). Therefore, in this example, it is showing the status as warning level because only 96.4% of the time, the set cycle period was met successfully.

Step 2 Use Dashboard "GMCV Week" - This dashboard helps you quickly answer these two questions:

- ✓ **How often and when the RPO is missed?**
- ✓ **For how long was the cycle period exceeded?**

It is important to see what is going on with the replication to be able to analyze and look for variations to learn at which periods during the day or even which periods during the week the RPO can be met. This dashboard shows the copy quality over a period of seven consecutive days. The row below it, displays a chronological progression of the day; from which one can recognize the individual problems over the day.

The red line spikes indicate precisely **how often** the RPO was **not met** and **when** during the selected period.

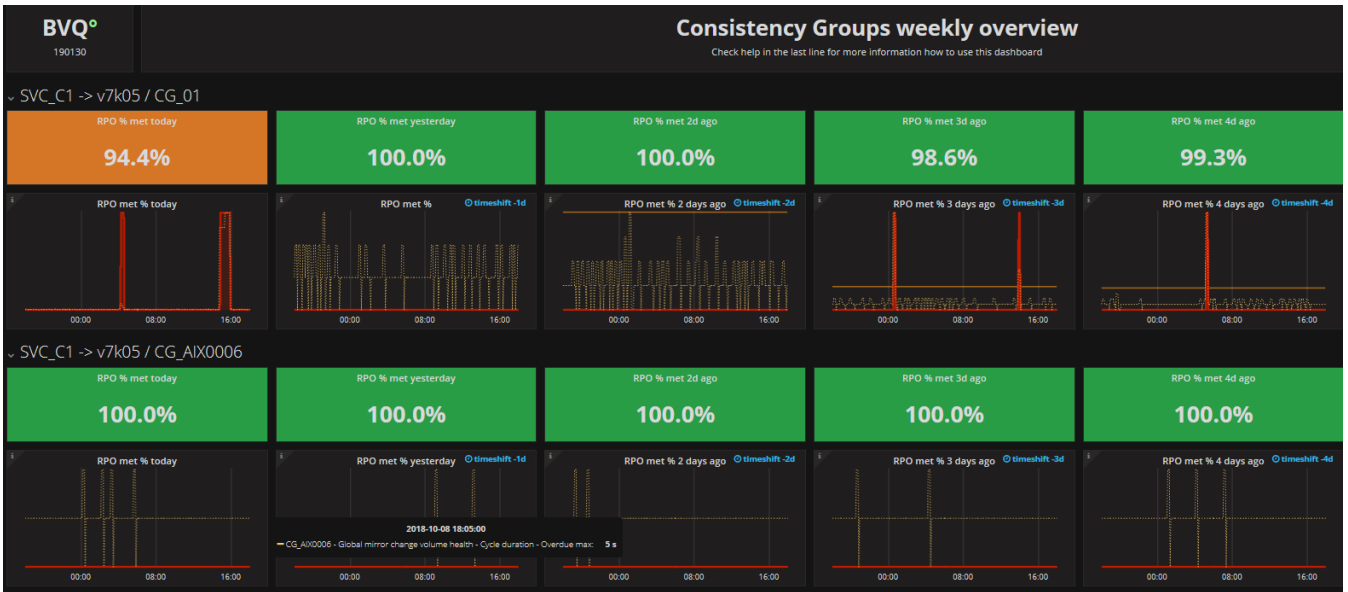


Figure 2 Detailed view for all consistency groups from a single view with status an indicators of when and by how many seconds the cycle time has been exceeded.

From each of the heatmaps, you can call up a detailed view of a particular consistency group as shown in Figure 3.

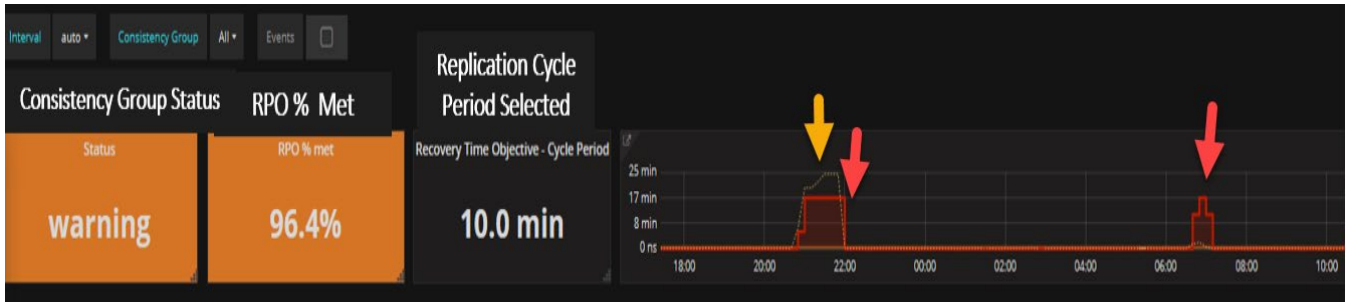


Figure 3. Detail view of a consistency group, which could not keep its cycles. It is very easy to recognize the problem periods and determine the fine yellow line by how many seconds the cycle time has been exceeded.

Figure 3. shows a detailed view of what is happening with consistency group CG_01. It shows the cycle period set for this particular consistency group, is 10 minutes. Then it shows the two problem periods and when they occur, depicted by the red line. One problem started at around 20:00 hours and the second problem started at 7:00 hours. The dotted yellow line indicates how many seconds/minutes the cycle has been exceeded by. In the first problem, the cycle time has been exceeded by 25 minutes. This information is very helpful because it gives the administrator insight to be able to tune the cycle period to an optimal period in cases when this problem happens frequently.

Step 3 “Use GMCV Analysis”

The GMCV Analysis Dashboard is used to find out more about the reasons for a missed recovery point. The information given, helps answer this question:

✓ What is preventing the RPO from being met?

The three most common reasons why the RPO is not met are:

1. A high replication load is produced during the replication process; which prevents the copy to finish within the set cycle period. This high load could occur due to the characteristic of the workload and behavior of the copy process.

Important insight: It is important to note that in many cases, a high load is produced to the Auxiliary (secondary) volumes and is caused by the characteristic of the workload. This means that the type of data access (serial or random) of the workload has a huge impact on the load generated during copy operations (flashcopy). Therefore, the high or low loads the volumes produce, are influenced by the flashcopy operations (example shown in Figure 4).

BVQ helps you see the behavior of the copy operation from the Master Volumes through the Change Volumes up to the Auxiliary Volumes, to help you identify where these high loads are coming from and understand what to expect.

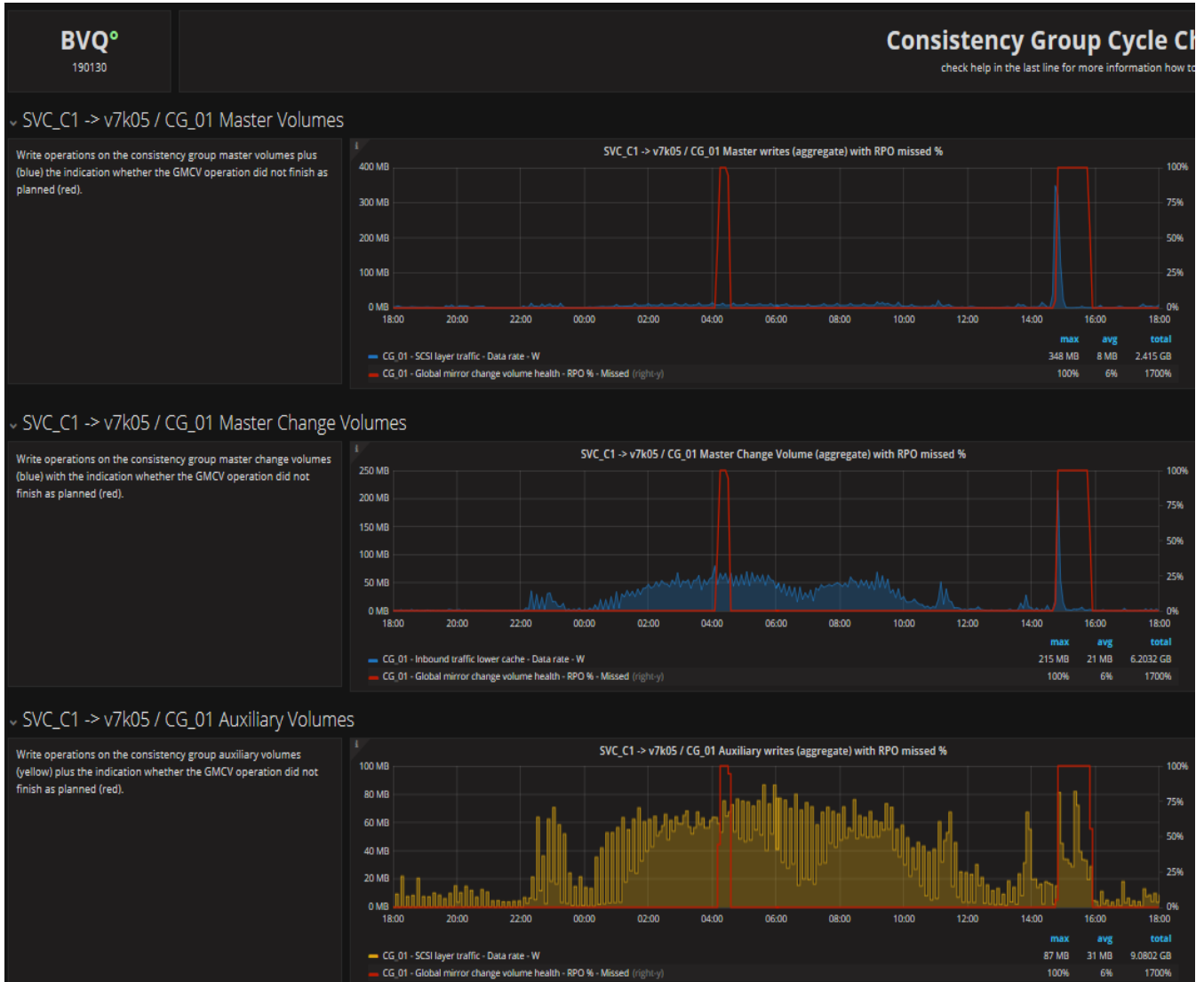


Figure 4. Example of a workload that is creating a high load during the copy operation to the Auxiliary Site (yellow line)- bottom row

2. There are situations where a high load is generated sporadically by a single or small set of volumes, then the dashboard helps identify which group or single volume belonging to the specific consistency group is driving the high load

Figure 5 below shows what is going with each volume at the Auxiliary side. Each yellow line represents the volume's write operation at the remote site. The spikes in red are indicating the copy operation was not completed in the expected time. At the same time the spikes occur, you can see a high data load (yellow line) occurring as well. This means the high data load is responsible for the failure. Not only that, you can easily determine which volume/s are responsible for the issue by scanning the line with the mouse. The name of the volume is **b3p_dat0 A**. If these values are constantly too high, you can use this insight to help set a new cycle time in order to achieve a higher recovery point quality in the copy actions.

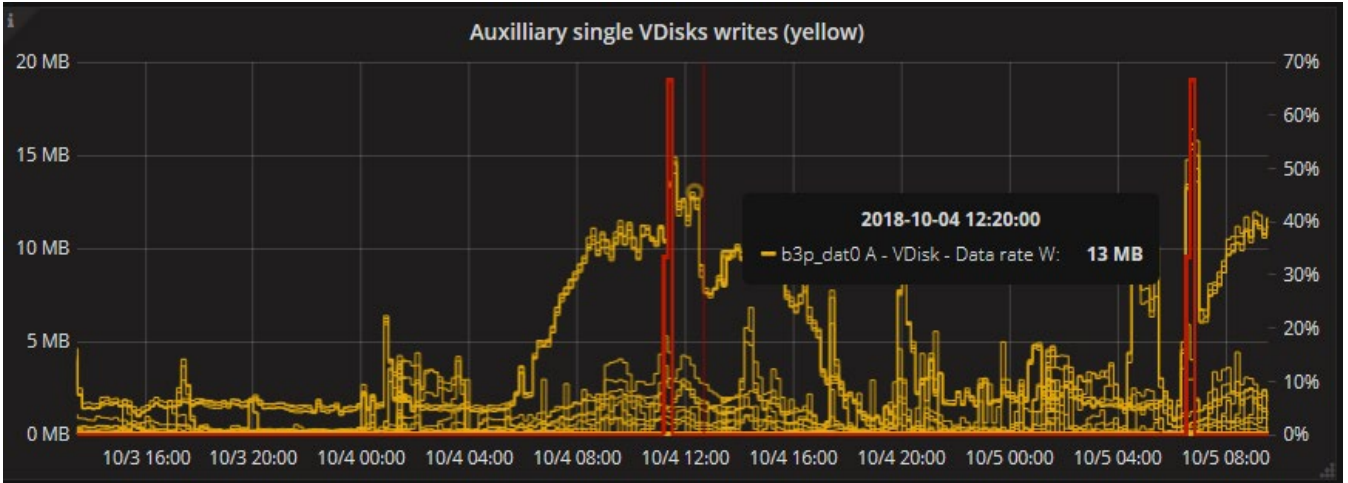


Figure 5. Detailed view of the replication at the Auxiliary side with single lines for each volume. Volume b3p_dat0 A is causing the cycle period to overflow

3. The third most common reason why an RPO is not met, is a saturation of the path between the clusters. The analysis dashboard also contains a view of the Cluster to Cluster Write operations from the paths used by the selected consistency groups. This allows you to determine if the size of the link is not sufficient to handle the load. You can see exactly the data volumes' size (MiB/s in blue) and latencies on the line (ms in red). Look for spikes which can indicate the line is at the limit of the available bandwidth. In case these spikes last a considerable time and happen often, then this could be an indication that the bandwidth needs to be re-sized.

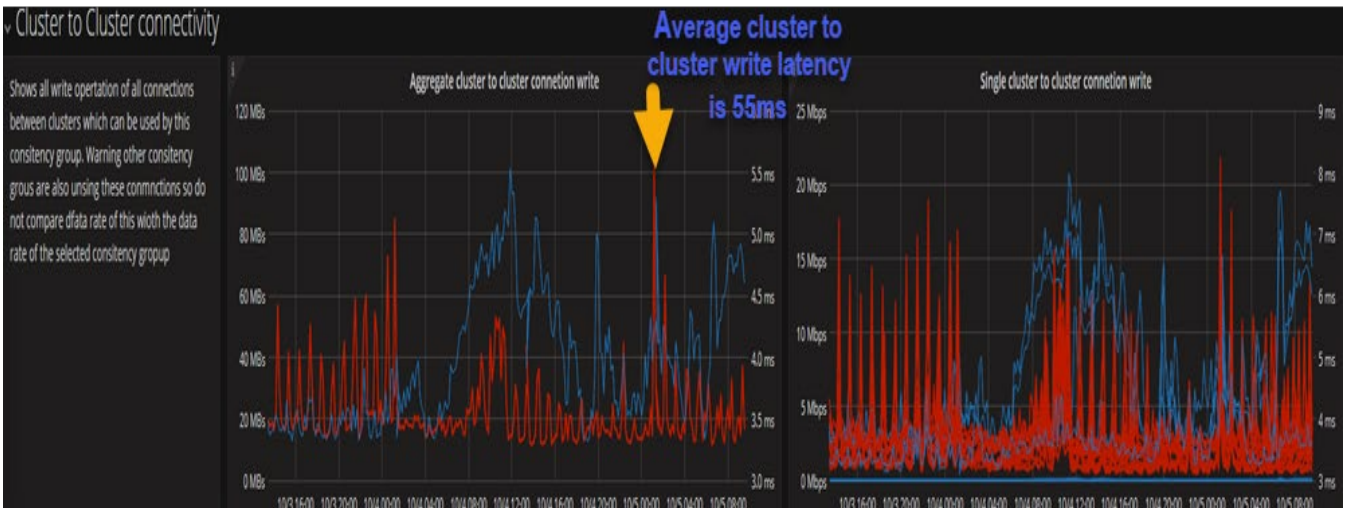


Figure 6. Cluster to Cluster connectivity. Data rate and latency on the line

Next Steps the Administrator should take:

The insight provided by BVQ empowers the administrator with knowledge that can be shared with the DR team to plan out a successful DR strategy that meets the company's SLA. The administrator can now confidently implement the following changes:

1. Use BVQ to create **alerts to eliminate the risks even further.**
2. Make adequate tweaking of the cycle period in order to consistently meet the RPO.
3. Accurately report the Recovery Point Objective that can be guaranteed on a consistent basis based on the characteristics of the workloads.
4. Size the bandwidth correctly or confirm the link has an adequate bandwidth that will meet the peak workloads during critical business hours.

CONCLUSION

Storage administrators can use BVQ to help them save time and effort when implementing GMCV in their environment. It is the unique tool that helps determine the optimal cycle period to fit the replication load and the existing bandwidth. BVQ allows to accurately determine a Recovery Point Objective that can be guaranteed on a consistent basis. This is important because RPOs that are stated and are only being met by chance, are not good quality of service.

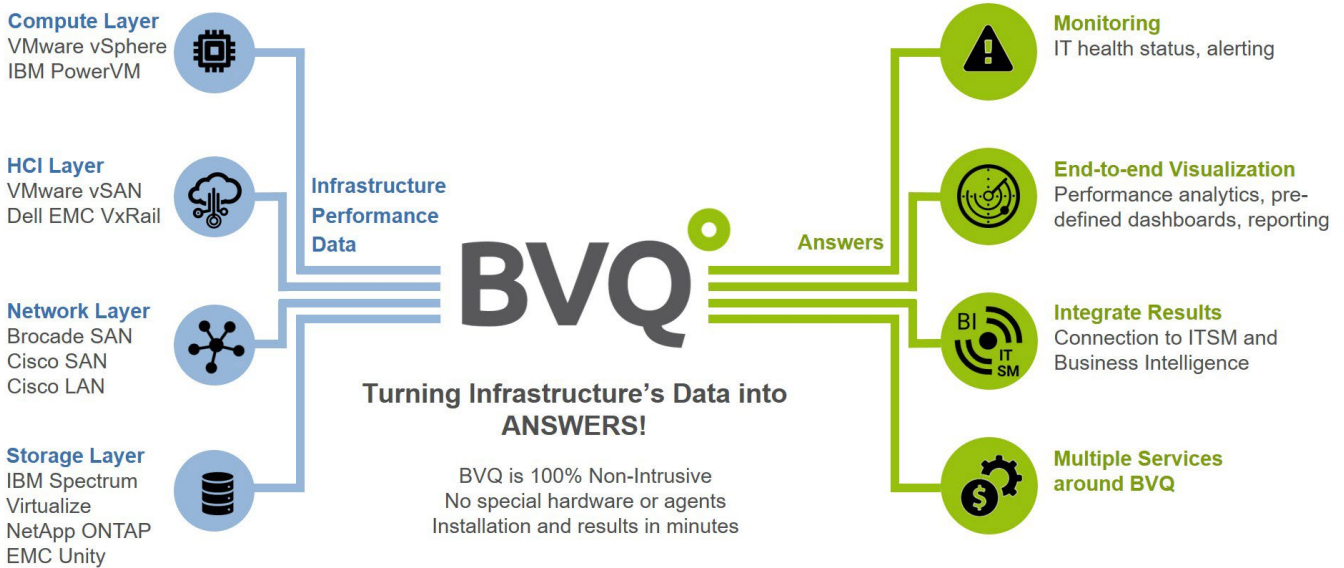
About BVQ

BVQ is the most comprehensive monitoring and troubleshooting solution for IBM Spectrum Virtualize Storage. It provides insight into the performance and health of IBM Spectrum Virtualize storage, VMware virtualization, and Brocade SAN.

Its value lies in identifying issues before the business operations are affected as well as assist in optimizing the systems for best possible performance.


BVQ is easy to implement, easy to use, affordable and fits in all environments.


End-to-end answers



Request a demo by visiting svasoftware.com



 401 Hackensack Ave, 4th Fl,
Hackensack, NJ 07601

 1-833-782-1234

 sales@svasoftware.com

 www.svasoftware.com

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