

The Unique Management Capabilities of Xsigo's Quality of Service (QoS)

Executive Summary

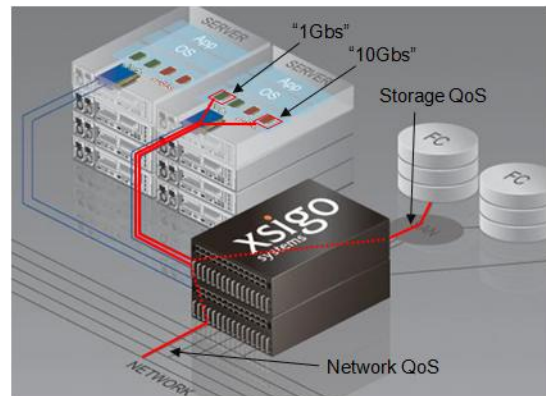
This paper discusses the Quality of Service (QoS) functionality for the Xsigo I/O Director and the mechanisms Xsigo's QoS uses to manage I/O congestion in a network to ensure that applications have sufficient network and storage resources to communicate effectively and appropriately for the variety of traffic they use.

Using QoS, a network can be configured for stable and predictable end-to-end performance, allow for aggressive setting of SLAs and ensure that those SLAs are met.

Use Cases

The Xsigo I/O Director is the only datacenter device that can apply networking and storage quality of service without disruption to the server, application or end user. The Server, Storage and Networking administrators can provide the I/O connectivity when and where it's needed on the fly, even remotely.

With the ability to dynamically apply a QoS policy administrators can manipulate the network and storage landscape according to the business requirements at any particular time.



Scenario 1:

It is the end of the quarter and the finance department is complaining that their systems have slowed to a crawl. A quick review of the I/O indicates that the application and storage I/O requirements have increased dramatically as they try to close the quarter. The application administrator can increase the network and storage bandwidth to the servers housing the finance servers immediately without a service disruption to the end user. After the quarter has closed and the finance department no longer needs the lion's share of the I/O, the application admin can return the connectivity back to the levels employed before quarter end. As this is a repeatable pattern, the admin can now schedule this I/O increase/decrease automatically, ensuring a smooth quarter close every quarter.

Scenario 2:

The IT department for Company A has deployed a new intranet server. At first the server is underutilized, but as the company employees realize the benefits and the ease of access to information the usage spikes dramatically. The intranet administrator can increase network bandwidth and storage capabilities on the fly without disruption. He no longer has to wait for a maintenance window to make changes and he no longer has to make physical changes to the server or storage systems to make this happen.

Scenario 3:

MSP Company B is in business to deliver networks to their clients. The company gets paid by the size of the network pipe or storage disk size. Company C purchased a network from Company B a year ago. At the time they required a one GE network pipe and 200 gig storage drive. Their business has increased dramatically lately and they now require a 10GE network pipe and a terabyte of storage. With the Xsigo I/O Director, Company B can provision that change within minutes without end user disruption, allowing them to start charging company C for that additional capability immediately instead of having to wait for physical changes and maintenance windows. Company C gets their additional requirements filled immediately and painlessly, and Company B gets their money faster.

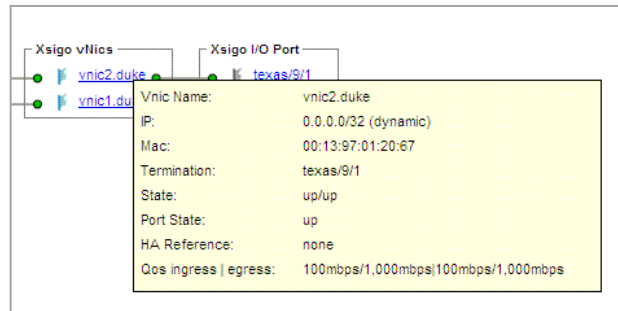
Network QoS

With the Xsigo I/O Director, QoS can be set for Ethernet networking and storage. For networking, Quality of Service (QoS) ensures that bandwidth is available by using parameters to control how much traffic is allowed on a vNIC at any given time. QoS parameters are configured within a Network QoS Set and that Set is bound to a vNIC.

The act of binding the Network QoS Set to a vNIC determines which vNICs have QoS enforced. If a Network QoS Set is not bound to a vNIC, the vNIC does not have the benefit of QoS and bandwidth usage conditions and rates are not applied.

On a vNIC, QoS is configured in a Network QoS Set. XMS supports Network QoS through Policer Profiles on vNICs and their underlying Ethernet links.

Network QoS sets can be either a default QoS set or a custom QoS set:



The Xsigo management interface provides interface configuration data, including QoS settings, when you mouse over an I/O resource.

- A default QoS set is supplied by Xsigo in different bandwidth configurations to facilitate QoS use on vNICs.
- A custom QoS set is one that you create and to which you assign QoS parameters that are pertinent to your network.

Network QoS on the I/O Director is enforced through one or more Policer Profiles in each QoS Set. The QoS Set is applied to the card, but individual Policer Profiles are applied to individual vNICs. Policer Profiles guarantee bandwidth by dropping packets that exceed the peak information rate (PIR) and peak burst size (PBS) arguments.

The Xsigo QoS model contains default QoS Sets. Within the default QoS Set, one or more entries exist. Each entry is preconfigured for efficient bandwidth availability and resource usage. You can apply the default QoS sets directly to an object (for example, an Ethernet port), or use them as templates to guide your creation of custom QoS Sets.

Table 1 - Contents of the QoS Policer Profile Table

<u>Field</u>	<u>Indicates</u>
Name	The name of each Policer Profile configured in the QoS Set.
CIR	The committed information rate of the Policer Profile. This is the guaranteed amount of bandwidth for committed traffic on the vNIC
PIR	The Peak Information Rate of the Policer Profile. This is the maximum amount of bandwidth for committed traffic on the vNIC.
CBS	The Committed Burst Size. This is the guaranteed amount of bandwidth for bursty traffic on the vNIC.
PBS	The Peak Burst Size. This is the maximum amount of bandwidth allowed for bursty traffic on the vNIC.
vNICs	The total number of vNICs that are managed by each Policer Profile.
Description	The description (if any) that was assigned to the Policer Profile when it was created.

QoS in a High Availability vNIC Pair

The Xsigo I/O director allows you to specify QoS in a high availability configuration. In an HA vNIC pair, the same Network QoS Sets, Policer Profiles, and QoS parameters must be bound to both the primary and secondary vNICs. During normal operation, the primary supports traffic and the QoS parameters are applied to traffic on the primary vNIC. With QoS configured on the vNIC pair, if a switchover event occurs, the QoS parameters of the secondary vNIC are used until the primary vNIC comes back online. To ensure consistent behavior during switch over and switch back, make sure you configure the same QoS parameters on both the primary and secondary vNIC.

Storage QoS

The Xsigo I/O director is the only datacenter ready hardware that allows you to apply storage quality of service on the fly to any application server without service disruption. This allows the

storage or server administrator to proactively get ahead of the business requirements by monitoring and managing the storage connectivity.

When you configure a SAN QoS Profile on a virtual HBA, you are assigning Shaping parameters to the traffic on the vHBA. SAN QoS Profiles apply to both read and write data.

The SAN QoS Shaping Service for the vHBA uses the following parameters to guarantee bandwidth:

- Committed Information Rate (CIR)
- Peak Information Rate (PIR)
- Committed Burst Size (CBS)
- Peak Burst Size (PBS)

You can assign only one SAN QoS Shaping Service to a vHBA. However, you can assign the same QoS Shaping Service to multiple, different vHBAs.

SAN QoS on the I/O Director is enforced by a Shaper Profile. Shaping guarantees bandwidth by smoothing traffic on the vHBA through queuing and delaying fibre channel frames that exceed the CIR and PIR values you set.

Table 2 – Contents of the SAN QoS Summary Table

<u>Field</u>	<u>Indicates</u>
Name	The name of the SAN QoS Profile.
Chassis name	The name of the I/O Director on which the SAN QoS Profile was created.
CIR	The committed information rate configured in the SAN QoS Profile.
PIR	The peak information rate configured in the SAN QoS Profile.
CBS	The committed burst size configured in the SAN QoS Profile.
PBS	The peak burst size configured in the SAN QoS Profile.
vHBAs applied	The total number of vHBAs on which the SAN QoS Profile is applied.
Description	An optional description of each SAN QoS Profile

About Xsigo Systems

Xsigo is the technology leader in data center I/O virtualization, a solution that dramatically reduces operational expense by changing the way that servers are connected to networks and storage.



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