

**State of Wisconsin**  
**Wide Area Network (WAN)**  
**Quality of Service (QoS)**  
**Service Offering Definition (SOD)**



## Document Revision History

Date	Version	Creator	Notes
01/11/12	1.0	Amy Dustin	Original document

## Table of Contents

Introduction .....	4
What Is Included .....	4
What Is Not Included .....	4
Benefits.....	4
Service Description .....	5
Service Offering Review .....	6
Roles and Responsibilities .....	6
Business Continuity.....	6
Monitoring .....	6
Configuration Overview.....	6
How Services Are Charged .....	6
Cost-Saving Tips.....	6

## Introduction

Quality of Service (QoS) refers to a broad collection of networking technologies and techniques. The BadgerNet Converged Network (BCN) is configured to perform some types of QoS which regulates bandwidth, including traffic shaping from an agency headquarter site to their remote sites and policing from remote sites to the headquarter site.

Traffic shaping is a QoS technique that buffers network traffic in order to comply with the contracted Wide Area Network (WAN) services limit. Traffic is only dropped if the buffers are full. Traffic policing is a QoS technique that drops network traffic in order to comply with the contracted WAN services limit. Traffic is dropped immediately if the bandwidth threshold is exceeded.

This QoS service offering is intended to provide BCN customers' additional strategies to establish differentiated service priorities on the WAN traffic to meet their specific business needs. This is not intended to be a widespread implementation, but an optional offering to be applied where it is determined to be an effective solution for traffic congestion.

The QoS service is used to ensure optimal and efficient use of network bandwidth for business applications. It may not eliminate the need for increasing bandwidth or the implementation of other solutions to address network latency.

The BCN WAN service is a prerequisite for this service offering.

## What Is Included

- Engagement with the customer to identify the business needs for WAN traffic which will be used to establish the QoS policy and to determine if the High Priority-Low Latency (HPLL) Transport service is needed
- Replacement of existing BCN routers in cases where the hardware will not support the agency QoS requirements
- Development and implementation of the QoS policies on the remote and headquarter BCN devices
- Ongoing review and modification to the QoS policies as an agencies requirements change

## What Is Not Included

- BCN bandwidth changes
- QoS policy creation without agency business requirements defined
- Full audit of an agency's network traffic
- QoS configuration on high bandwidth links (i.e. links greater than 100Mbps or encrypted links greater than 45Mbps) that require traffic shaping. Requests for this type of QoS configurations will be assessed on a case-by-case basis to determine if there are additional hardware costs to be recovered.

## Benefits

- Offers the customers the opportunity to define their WAN traffic business objectives to be achieved by QoS

- QoS allows for more predictable service priorities for network traffic when the network is congested

## Service Description

DET provides the network equipment and support for the QoS services to subscribing customer agencies.

The QoS service offers BCN customers the option to have differentiated service priorities applied to network traffic as needed in order to:

- Prioritize traffic for latency sensitive applications such as voice and video
- Guarantee a set amount of bandwidth for business critical applications allowing for more predictable service priorities for the application traffic
- Provide best effort service for non-critical business application which are not time sensitive

The specific QoS configurations this service offering provides are queuing, prioritization and marking. This QoS strategy allows the customers, with the assistance of DET, to classify which business applications require higher prioritization during times of network congestion at their BCN site(s). Once the business requirements and traffic priorities are established, DET will develop an appropriate QoS policy, have it approved by the subscriber, and implement the policy on the DET managed remote and headquarter devices. The policies will align with the BCN vendor's QoS configurations.

The subscriber will work with DET support staff to identify traffic type and required service priorities. Agency traffic may be classified into the following four categories:

Category	Use case
Real Time	Latency sensitive applications such as voice and video that must be prioritized.
Critical Data	Critical business applications that require bandwidth to be reserved.
Best Effort	Non-critical business applications that are not time sensitive.
Drop	Applications that are not permitted.

A typical QoS policy would provide low latency queuing for real-time traffic, reserve a certain amount of bandwidth for critical applications, drop undesirable traffic, and provide congestion avoidance and fair queuing for the remainder of the traffic.

For some situations where QoS is to be applied, the BCN circuits may need to be converted to the High Priority-Low Latency (HPLL) Transport service. HPLL is an enhancement to the WAN service that is used to: (a) differentiate High Priority Traffic, such as video or VoIP; and (b) preserve QoS configuration. There is no cost from the BCN vendor to convert a circuit to HPLL. DET will work with the customers to determine if the HPLL service is required.

Although QoS is tested in a DET lab environment, there is no way to simulate a large amount of real network traffic within the lab, so QoS must be deployed in a cautious manner to observe the effect on the network devices and application traffic. Close analysis

will be needed to make sure that adding QoS does not overburden the CPU of the head end or remote BCN routers.

As the customers' business requirements change, they are responsible for informing DET so the existing QoS policies may be reviewed and updated as necessary.

## **Service Offering Review**

The SOD, Roles and Responsibilities (RnR) and Rate will be reviewed annually to determine if any modifications are required.

## **Roles and Responsibilities**

Roles and Responsibilities for the QoS service can be found [here](#).

## **Business Continuity**

The WAN QoS service can guarantee delivery of business critical application traffic in the event that undesirable or other non-critical traffic is attempting to consume all available bandwidth.

## **Monitoring**

Standard BCN monitoring is provided including reporting and alerting to DET support staff.

## **Configuration Overview**

A typical QoS policy would provide low latency queuing for real-time traffic, reserve a certain amount of bandwidth for critical applications, drop undesirable traffic, and provide congestion avoidance and fair queuing (e.g. all applications receive equal treatment) for the remainder of the traffic. However, the QoS policy will be tailored to meet each customer's business requirements.

## **How Services Are Charged**

The QoS rate is per BCN site per month and covers the employee staffing to support the service.

Please see the [IT Services Rate Sheet](#) for rate information.

## **Cost-Saving Tips**

By utilizing this service to prioritize business critical applications, there may be sufficient bandwidth to handle the important business processing, thereby postponing or eliminating the need for an increase in bandwidth.