WHAT IS CLAIMED IS:

1. A computer-implemented method comprising:

maintaining a plurality of buffers at a receiver host, the plurality of buffers comprising a regular buffer and a shadow buffer;

responsive to receiving a data flow from a sender host that is clock-synchronized with the receiver host using a common reference clock, incrementing a counter of the shadow buffer that indicates a unit of data traffic received;

determining a dynamic drain rate based on a number of units of the data removed from the regular buffer per unit of time while receiving the data flow;

calculating a dwell time as a function of the counter of the shadow buffer and the dynamic drain rate; and

determining a congestion signal for the data flow based on the dwell time.

2. The computer-implemented method of claim 1, wherein the plurality of buffers comprise a plurality of shadow buffers, the plurality of shadow buffers comprising the shadow buffer.

3. The computer-implemented method of claim 2, wherein each of the plurality of shadow buffers acts on a different subset of a plurality of data flows received by the receiver host.

4. The computer-implemented method of claim 3, wherein each different subset is determined to include data flows common to a different given application to which the data flows correspond, each different application having a different priority, the dynamic drain rate weighted on a basis of the different priority.

5. The computer-implemented method of claim 3, wherein each different subset is determined to include data flows common to a given set of senders.

6. The computer-implemented method of claim 1, where incrementing the counter comprises multiplying the unit of data traffic received by a factor.

7. The computer-implemented method of claim 1, further comprising, while the shadow buffer is in an active state, decrementing the shadow buffer at a slower rate than the data is removed from the regular buffer.

8. The computer-implemented method of claim 7, wherein the slower rate is determined by multiplying a rate at which data is removed from the regular buffer by a factor greater than 0.9 but less than 1.

9. The computer-implemented method of claim 1, wherein the dwell time is calculated by a value of the counter of the shadow buffer divided by the dynamic drain rate.

10. The computer-implemented method of claim 1, wherein the dynamic drain rate is held responsive to the shadow buffer transitioning to an idle state, and wherein the dynamic drain rate is re-determined responsive to the shadow buffer transitioning back to an active state.

11. The computer-implemented method of claim 1, wherein determining the congestion signal comprises mathematically aggregating a one way delay between the sender host and the receiver host with the dwell time.

12. The computer-implemented method of claim 11, wherein mathematically aggregating the one way delay comprises weighting the dwell time by a factor.

13. A non-transitory computer-readable medium comprising memory with instructions encoded thereon, the instructions, when executed, causing one or more processors to perform operations, the instructions comprising instructions to:

maintain a plurality of buffers at a receiver host, the plurality of buffers comprising a regular buffer and a shadow buffer;

responsive to receiving a data flow from a sender host that is clock-synchronized with the receiver host using a common reference clock, increment a counter of the shadow buffer that indicates a unit of data traffic received;

determine a dynamic drain rate based on a number of units of the data removed from the regular buffer per unit of time while receiving the data flow;

calculate a dwell time as a function of the counter of the shadow buffer and the dynamic drain rate; and

determine a congestion signal for the data flow based on the dwell time.

14. The non-transitory computer-readable medium of claim 13, wherein the plurality of buffers comprise a plurality of shadow buffers, the plurality of shadow buffers comprising the shadow buffer.

15. The non-transitory computer-readable medium of claim 14, wherein each of the plurality of shadow buffers acts on a different subset of a plurality of data flows received by the receiver host.

16. The non-transitory computer-readable medium of claim 15, wherein each different subset is determined to include data flows common to a different given application to which the data flows correspond, each different application having a different priority, the dynamic drain rate weighted on a basis of the different priority.

17. The non-transitory computer-readable medium of claim 15, wherein each different subset is determined to include data flows common to a given set of senders.

18. The non-transitory computer-readable medium of claim 13, where the instructions to increment the counter comprise instructions to multiply the unit of data traffic received by a factor.

19. The non-transitory computer-readable medium of claim 13, the instructions further comprising instructions to, while the shadow buffer is in an active state, decrement the shadow buffer at a slower rate than the data is removed from the regular buffer.

20. The non-transitory computer-readable medium of claim 19, wherein the slower rate is determined by multiplying a rate at which data is removed from the regular buffer by a factor greater than 0.9 but less than 1.