CLAIMS

1. A buffer arbitration communication system, said system including:

a first buffer, wherein said first buffer receives a first packet, wherein said first packet includes at least one first packet word,

wherein said first buffer is associated with a first buffer real rank;

a second buffer, wherein said second buffer receives a second packet, wherein said second packet includes at least one second packet word,

wherein said second buffer is associated with a second buffer real rank;

a data sink, wherein said data sink may receive data words from either said first buffer or said second buffer;

a buffer rank calculator, wherein said buffer rank calculator stores said first buffer real rank and said second buffer real rank,

wherein said first buffer real rank is increased according to a first stored decay equation for each first packet word transmitted by said first buffer to said sink,

wherein said first buffer real rank is decreased according to a first stored recovery equation for each sink transmission cycle during which said first buffer does not transmit a first packet word to said sink, down to a minimum of a predetermined minimum rank for said first buffer,

wherein said second buffer real rank is increased according to a second stored decay equation for each second packet word transmitted by said second buffer to said sink,

wherein said second stored decay equation differs from said first stored decay equation,

wherein said second buffer real rank is decreased according to a second stored recovery equation for each sink transmission cycle during which said second buffer does not transmit a second packet word to said sink, down to a minimum of a predetermined minimum rank for said second buffer,

wherein said buffer rank calculator determines a first buffer absolute rank by rounding said first buffer real rank down to the next whole integer,

wherein said buffer rank calculator determines a second buffer absolute rank by rounding said second buffer real rank down to the next whole integer; and

a buffer selector wherein said buffer selector selects which of said first buffer and said second buffer to allow to transmit words to said sink,

wherein said buffer selector selects said first buffer when said first buffer absolute rank is less than said second buffer absolute rank and selects said second buffer when said second buffer absolute rank is less than said first buffer absolute rank.

2. The system of claim 1 wherein said first stored decay equation differs from said second stored decay equation.

3. The system of claim 1 wherein said first stored recovery equation differs from said second stored recovery equation.

4. The system of claim 1 wherein said predetermined minimum rank for said first buffer differs from said predetermined minimum rank for said second buffer.

5. The system of claim 1 further including a Weighted Priority Randomized (WPR) Scheduler,

wherein said WPR Scheduler includes a Weighted Priority Table,

wherein said Weighted Priority Table includes a first buffer selection probability and a second buffer selection probability.

6. The system of claim 5 wherein, when said first buffer absolute rank equals said second buffer absolute rank, said WPR Scheduler uses said first buffer selection probability and said second buffer selection probability to randomly select which of said first buffer and said second buffer to allow to transmit data to said sink.

7. The system of claim 5 further including a Credit Accumulation Engine (CAE),

wherein said CAE includes a first buffer credit entry and a second buffer credit entry,

wherein said CAE awards a credit to said first buffer by incrementing said first buffer credit entry when said second buffer is transmitting data to said sink and said first buffer is unable to transmit data to said sink,

wherein said CAE awards a credit to said second buffer by incrementing said second buffer credit entry when said first buffer is transmitting data to said sink and said second buffer is unable to transmit data to said sink.

8. The system of claim 7 wherein, when neither of said first buffer and said second buffer are currently transmitting data to said sink and said first buffer absolute rank equals said second buffer absolute rank, said WPR Scheduler compares said first buffer credit entry with said second buffer credit entry and allows the buffer having the higher credit entry to communicate with said sink.

9. The system of claim 8 wherein, when said first buffer credit entry equals said second buffer credit entry, said WPR Scheduler uses said first buffer selection probability and said second buffer selection probability to randomly select which of said first buffer and said second buffer to allow to transmit data to said sink.

10. The system of claim 7 wherein said credit awarded to said first buffer is different from said credit awarded to said second buffer.

11. A method for arbitrating between buffers, said method including:

receiving a first packet at a first buffer, wherein said first packet includes at least one first packet word,

wherein said first buffer is associated with a first buffer real rank;

receiving a second packet at a second buffer, wherein said second packet includes at least one second packet word,

wherein said second buffer is associated with a second buffer real rank;

providing a data sink that is configured to optionally receive data words from either said first buffer or said second buffer;

storing said first buffer real rank and said second buffer real rank at a buffer rank calculator,

increasing said first buffer real rank according to a first stored decay equation for each first packet word transmitted by said first buffer to said sink,

decreasing said first buffer real rank according to a first stored recovery equation for each sink transmission cycle during which said first buffer does not transmit a first packet word to said sink, down to a minimum of a predetermined minimum rank for said first buffer,

increasing said second buffer real rank according to a second stored decay equation for each second packet word transmitted by said second buffer to said sink, wherein said second stored decay equation differs from said first stored decay equation,

decreasing said second buffer real rank according to a second stored recovery equation for each sink transmission cycle during which said second buffer does not transmit a second packet word to said sink, down to a minimum of a predetermined minimum rank for said second buffer

determining, using said buffer rank calculator, a first buffer absolute rank by rounding said first buffer real rank down to the next whole integer,

determining, using said buffer rank calculator, a second buffer absolute rank by rounding said second buffer real rank down to the next whole integer; and

selecting, using a buffer selector, which of said first buffer and said second buffer to allow to transmit words to said sink,

wherein said buffer selector selects said first buffer when said first buffer absolute rank is less than said second buffer absolute rank and selects said second buffer when said second buffer absolute rank is less than said first buffer absolute rank.

12. The method of claim 11 wherein said first stored decay equation differs from said second stored decay equation.

13. The method of claim 11 wherein said first stored recovery equation differs from said second stored recovery equation.

14. The method of claim 11 wherein said predetermined minimum rank for said first buffer differs from said predetermined minimum rank for said second buffer.

15. The method of claim 11 further including providing a Weighted Priority Randomized (WPR) Scheduler,

wherein said WPR Scheduler includes a Weighted Priority Table,

wherein said Weighted Priority Table includes a first buffer selection probability and a second buffer selection probability.

16. The method of claim 15 wherein, when said first buffer absolute rank equals said second buffer absolute rank, said WPR Scheduler uses said first buffer selection probability and said second buffer selection probability to randomly select which of said first buffer and said second buffer to allow to transmit data to said sink.

17. The method of claim 15 further including providing a Credit Accumulation Engine (CAE),

wherein said CAE includes a first buffer credit entry and a second buffer credit entry,

awarding a credit, using said CAE, to said first buffer by incrementing said first buffer credit entry when said second buffer is transmitting data to said sink and said first buffer is unable to transmit data to said sink,

awarding a credit, using said CAE, to said second buffer by incrementing said second buffer credit entry when said first buffer is transmitting data to said sink and said second buffer is unable to transmit data to said sink.

18. The method of claim 17 wherein, when neither of said first buffer and said second buffer are currently transmitting data to said sink and said first buffer absolute rank equals said second buffer absolute rank, said WPR Scheduler compares
said first buffer credit entry with said second buffer credit entry and allows the buffer having the higher credit entry to communicate with said sink.

19. The method of claim 18 wherein, when said first buffer credit entry equals said second buffer credit entry, said WPR Scheduler uses said first buffer selection probability and said second buffer selection probability to randomly select which of said first buffer and said second buffer to allow to transmit data to said sink.

20. The method of claim 17 wherein said credit awarded to said first buffer is different from said credit awarded to said second buffer.