

WHAT IS CLAIMED IS:

1. A network device, comprising:
 - a plurality of physical transceiver ports, the plurality of physical transceiver
 - 5 ports to transfer data across a network at a predetermined fixed data rate; and
 - a virtual circuit coupled to the plurality of physical transceiver ports, the
 - virtual circuit to:
 - receive a first transfer request from a processor to transmit a first
 - incoming data stream at a first non-predetermined data rate;
 - 10 establish a first virtual port to receive the first incoming data stream;
 - select one or more physical transceiver ports from the plurality of
 - physical transceiver ports to form one or more selected physical transceiver ports in
 - response to the first transfer request where the one or more selected physical
 - transceiver ports have a total predetermined fixed data rate that is greater than the
 - 15 first non-predetermined data rate;
 - receive the first incoming data stream from the processor through the
 - virtual port after the one or more physical transceiver ports have been selected;
 - form one or more output data streams to run at the predetermined
 - fixed data rate, the one or more output data streams to incorporate the data from
 - 20 the first incoming data stream, the data from the first incoming data stream that is
 - incorporated within the one or more output data streams being timed to selected
 - pulses within a transmit clock signal that runs at the predetermined fixed data rate;
 - and
 - forward the one or more output data streams to the one or more
 - 25 selected physical transceiver ports.
2. The network device of claim 1, wherein when the first
- non-predetermined data rate of the first incoming data stream is less than the
- predetermined fixed data rate of a physical transceiver port, the virtual circuit to
- 30 select a physical transceiver port from the plurality of physical transceiver ports to
- form a selected physical transceiver port that has a predetermined fixed data rate

that is greater than the first non-predetermined data rate of the first incoming data stream.

3. The network device of claim 2, wherein the virtual circuit to further
5 form an output data stream to run at the predetermined fixed data rate, the output data stream to incorporate the data from the incoming data stream, the data from the incoming data stream incorporated within the output data stream being timed to selected pulses within the transmit clock signal.

10 4. The network device of claim 3, wherein virtual circuit to further:
receive a second transfer request from the processor to transmit a second incoming data stream at a second non-predetermined data rate that is less than the predetermined fixed data rate of the selected physical transceiver port;
establish a second virtual port to receive the second incoming data stream;
15 and
determine whether the selected physical transceiver port has an available data rate that is greater than the second non-predetermined data rate.

20 5. The network device of claim 4, wherein the virtual circuit to further:
receive the second incoming data stream at the second non-predetermined data rate from the processor after determining the available data rate;
when the available data rate of the selected physical transceiver port is greater than the second non-predetermined data rate, generate a revised output data stream to incorporate the data from the first incoming data stream and the
25 second incoming data stream where the data from the first incoming data stream and the second incoming data stream are timed to selected transmit clock signals;
and
forward the revised output data stream to the selected physical transceiver port.

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6. The network device of claim 5, wherein the predetermined fixed data rate has a data rate of x bits per second, and the virtual circuit to sub-divide the predetermined fixed data rate of x bits per second of a physical transceiver port into fractional parts, assigns the fractional parts to the first and second input data streams with non-predetermined data rates that are less than the predetermined fixed data rate of the physical transceiver port, and combine the fractional parts such that the combined bits per second of the combined data stream are equal to or less than the predetermined fixed data rate of x bits per second of the physical transceiver port.

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7. The network device of claim 5, wherein determining whether the selected physical transceiver port has an available data rate that is greater than the second non-predetermined data rate includes subtracting the first non-predetermined data rate from the predetermined fixed data rate of the first incoming data stream to obtain the available data rate, and comparing the available data rate to the second non-predetermined data rate.

8. The network device of claim 1, wherein when the non-predetermined data rate of the incoming data stream is greater than the predetermined fixed data rate of a physical transceiver port, the virtual circuit to:

establish a virtual port to receive the incoming data stream from the processor; and

select two or more physical transceiver ports from the plurality of physical transceiver ports where the two or more selected physical transceiver ports have a combined predetermined fixed data rate that is greater than the non-predetermined data rate of the incoming data stream.

9. The network device of claim 8, wherein the virtual circuit to further split the incoming data stream received from the virtual port into two or more split data streams that correspond with the two or more selected physical transceiver

ports, each of the two or more split data streams having non-predetermined data rates that are smaller than the predetermined fixed data rate.

10. The network device of claim 9, wherein the virtual circuit to further
5 form two or more output data streams to run at the predetermined fixed data rate, the two or more output data streams to incorporate the data from the two or more split data streams, the data from the split data streams incorporated within the two or more output data streams being timed to selected pulses within the transmit clock signal.

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11. A method of operating a network device, the method comprising:
receiving a first transfer request from a processor to transmit a first incoming
data stream at a first non-predetermined data rate;

establishing a virtual port to receive the first incoming data stream;

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selecting one or more physical transceiver ports that transmit data across a
network at a predetermined fixed data rate from a plurality of physical transceiver
ports to form one or more selected physical transceiver ports where the one or more
selected physical transceiver ports have a total predetermined fixed data rate that is
greater than the first non-predetermined data rate;

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receiving the first incoming data stream from the processor through the
virtual port after the one or more physical transceiver ports have been selected;

forming one or more output data streams to run at the predetermined fixed
data rate, the one or more output data streams to incorporate the data from the first
incoming data stream, the data from the first incoming data stream that is

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incorporated within the one or more output data streams being timed to selected
pulses within a transmit clock signal that runs at the predetermined fixed data rate;
and

forwarding the one or more output data streams to the one or more selected
physical transceiver ports.

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12. The method of claim 11, further comprising when the first non-predetermined data rate of the first incoming data stream is less than the predetermined fixed data rate of a physical transceiver port:

5 selecting a physical transceiver port from the plurality of physical transceiver ports to form a selected physical transceiver port where the selected physical transceiver port has a predetermined fixed data rate that is greater than the first non-predetermined data rate of the first incoming data stream.

establishing a virtual port to receive the incoming data stream; and
forming an output data stream to run at the predetermined fixed data rate
10 that corresponds with the selected physical transceiver port, the output data stream to incorporate the data from the incoming data stream, the data from the incoming data stream incorporated within the output data stream being timed to selected pulses within the transmit clock signal.

15 13. The method of claim 12, further comprising:

receiving a second request from the processor to transmit a second incoming data stream at a second non-predetermined data rate that is less than the predetermined fixed data rate of the selected physical transceiver port;

20 determining whether the selected physical transceiver port has an available data rate that is greater than the second non-predetermined data rate;

receiving the second incoming data stream from the processor after determining the available data rate;

when the available data rate of the selected physical transceiver port is greater than the second non-predetermined data rate, generating a reformed
25 output data stream to incorporate the data from the first incoming data stream and the second incoming data stream where the data from the first incoming data stream and the second incoming data stream are timed to selected transmit clock signals; and

30 forwarding the reformed output data stream to the selected physical transceiver port.

14. The method of claim 11, further comprising when the first non-predetermined data rate of the first incoming data stream is greater than the predetermined fixed data rate of a physical transceiver port:

5 selecting two or more physical transceiver ports from the plurality of physical transceiver ports where the two or more selected physical transceiver ports have a combined predetermined fixed data rate that is greater than the non-predetermined data rate of the incoming data stream;

establishing a virtual port to receive the incoming data stream; and

10 splitting the incoming data stream received from the virtual port into two or more split data streams that correspond with the two or more selected physical transceiver ports, each of the two or more split data streams having a smaller non-predetermined data rates than the non-predetermined data rate of the incoming data stream.

15 15. The method of claim 14, further comprising forming two or more output data streams to run at the predetermined fixed data rate, the two or more output data streams to incorporate the data from the two or more split data streams, the data from the split data streams incorporated within the two or more output data streams being timed to selected pulses within the transmit clock signal.

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16. A network system, comprising:

a network;

a first network device coupled to the network, the first network device having:

25 a plurality of first physical transceiver ports, the plurality of first physical transceiver ports to transfer data across the network at a predetermined fixed data rate; and

a first virtual circuit coupled to the plurality of first physical transceiver ports, the first virtual circuit to:

30 receive a first transfer request from a processor to transmit a first incoming data stream at a first non-predetermined data rate;

establish a first virtual port to receive the first incoming data stream;

select one or more first physical transceiver ports from the plurality of first physical transceiver ports to form one or more selected first physical transceiver ports where the one or more selected first physical transceiver ports have a total predetermined fixed data rate that is greater than the first non-predetermined data rate;

receive the first incoming data stream from the processor through the first virtual port after the one or more first physical transceiver ports have been selected;

form one or more output data streams to run at the predetermined fixed data rate, the one or more output data streams to incorporate the data from the first incoming data stream, the data from the first incoming data stream that is incorporated within the one or more output data streams being timed to selected pulses within a transmit clock signal that runs at the predetermined fixed data rate; and

forward the one or more output data streams to the one or more selected physical transceiver ports; and

a second network device coupled to the network, the second network device having:

a plurality of second physical transceiver ports, the plurality of second physical transceiver ports to transfer data across the network; and

a second virtual circuit coupled to the plurality of second physical transceiver ports, the second virtual circuit to:

receive a first network request from the first virtual circuit to receive the one or more output data streams at the first non-predetermined data rate from the one or more selected physical transceiver ports;

select one or more second physical transceiver ports from the plurality of second physical transceiver ports to form one or more selected second physical transceiver ports that correspond with the one or more selected first physical transceiver ports in response to the request from the first virtual circuit

where the one or more selected second physical transceiver ports have a combined predetermined fixed data rate that is greater than the first non-predetermined data rate; and

5 receive the one or more output data streams from the first network device with the selected one or more second physical transceiver ports.

17. The network system of claim 16, wherein the second virtual circuit to:
extract the data from the first incoming data stream that is incorporated
within the one or more output data streams from the one or more output data
10 streams to form one or more reconstituted data streams that run at the first non-predetermined fixed data rate, the one or more reconstituted data streams substantially matching the one or more first incoming data streams; and
forward the one or more reconstituted data streams to a second processor.

15 18. The network system of claim 17, wherein when the first non-predetermined data rate of the first incoming data stream is less than the predetermined fixed data rate of a physical transceiver port, the first virtual circuit to select a first physical transceiver port from the plurality of first physical transceiver
20 ports to form a selected first physical transceiver port where the selected first physical transceiver port has a predetermined fixed data rate that is greater than the first non-predetermined data rate of the first incoming data stream, the second virtual circuit to select a second physical transceiver port from the plurality of second physical transceiver ports to form a selected second physical transceiver port where
25 the selected second physical transceiver port has a corresponding selected first physical transceiver port, and a predetermined fixed data rate that is greater than the first non-predetermined data rate of the first incoming data stream.

19. The network system of claim 17, wherein when the first
30 non-predetermined data rate of the first incoming data stream is greater than the predetermined fixed data rate of a physical transceiver port, the first virtual circuit to

select two or more first physical transceiver ports from the plurality of first physical transceiver ports where the two or more selected first physical transceiver ports have a combined predetermined fixed data rate that is greater than the non-predetermined data rate of the incoming data stream, the second virtual circuit
5 to select two or more second physical transceiver ports from the plurality of second physical transceiver ports that correspond with the selected two or more first physical transceiver ports where the two or more selected second physical transceiver ports have a combined predetermined fixed data rate that is greater than the non-predetermined data rate of the incoming data stream.

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20. A non-transitory computer-readable storage medium having embedded therein program instructions, which when executed by a processor causes the processor to execute a method of operating a network device, the
15 method comprising:
receiving a first transfer request from a processor to transmit a first incoming data stream at a first non-predetermined data rate;
establishing a virtual port to receive the first incoming data stream;
selecting one or more physical transceiver ports that transmit data across a
20 network at a predetermined fixed data rate from a plurality of physical transceiver ports to form one or more selected physical transceiver ports where the one or more selected physical transceiver ports have a total predetermined fixed data rate that is greater than the first non-predetermined data rate;
receiving the first incoming data stream from the processor through the
25 virtual port after the one or more physical transceiver ports have been selected;
forming one or more output data streams to run at the predetermined fixed data rate, the one or more output data streams incorporate the data from the first incoming data stream, the data from the first incoming data stream that is incorporated within the one or more output data streams being timed to selected
30 pulses within a transmit clock signal that runs at the predetermined fixed data rate;
and

forwarding the one or more output data streams to the one or more selected physical transceiver ports.