

WHAT IS CLAIMED IS:

CLAIMS

1. A method of wireless communication performed by a device, comprising:
 - _receiving a plurality of data packets at a modem of the device;
 - grouping, at the modem of the device, payloads of a first subset of the plurality of data packets into a container;
 - of a plurality of containers associated with a transmission control protocol (TCP) connection or user datagram protocol (UDP) connection;
 - transferring, from the modem and to a processor of the device and using the modem, the container via a first interface channel; ~~and~~
 - associated with a first transfer ring;
 - transferring, from the modem and to the processor and using the modem, a second subset of the plurality of data packets via a second interface channel, ~~different from the first interface channel,~~ associated with a second transfer ring different from the first transfer ring; and providing, to the modem, an indication of one or more buffers associated with the first interface channel, wherein the indication of the one or more buffers comprises an indication of a respective software cookie associated with each of the one or more buffers.
2. The method of claim 1, wherein the first subset of the plurality of data packets comprises:
 - _a plurality of ~~transmission control protocol (TCP)~~ segments associated with a same TCP flow,
 - wherein the container comprises:
 - _a coalesced TCP frame having a coalescing frame header; or
 - _wherein the first subset of the plurality of data packets comprises:
 - _a plurality of ~~user datagram protocol (UDP)~~ packets associated with a same UDP stream,
 - _wherein the container comprises:
 - _a grouped UDP datagram having a single UDP header.
3. The method of claim 1, wherein a header associated with the container includes at least one of:
 - _a context identifier field that identifies a context identifier associated with the container,

_a checksum validity field that identifies whether a checksum error occurred for any of the plurality of data packets,

a checksum error bitmap field that identifies, if a checksum error occurred for any of the plurality of data packets, one or more data packets of the plurality of data packets associated with the checksum error,

_a plurality of packet number packet length (NL) fields,

_wherein each NL field identifies a quantity of the plurality of data packets that are a same packet length, or

_an NL quantity field that identifies a quantity of NL fields included in the header.

4. The method of claim 1, wherein at least one of: providing the first interface channel is associated with a first transfer ring;

~~wherein indication of the second interface channel is associated with a second transfer ring; and~~

~~wherein one or more buffers comprises providing the indication via the first transfer ring and the second transfer ring are different transfer rings.~~

~~5. The, or the method of claim 4, further comprising:~~

~~_providing, to the modem and using the processor, an indication, via the first transfer ring, of one or more first buffers associated with the first interface channel; and~~
~~providing, to the modem and using the processor, an indication, via the second transfer ring, of one or more second buffers associated with the second interface channel.~~

~~65. The method of claim 54, wherein transferring the container via the first interface channel comprises:~~

~~_storing the container in the one or more first buffers based at least in part on the indication of the one or more first buffers via the first transfer ring; and~~

~~_wherein transferring the second subset of the plurality of data packets via a second interface channel comprises:~~

~~_storing the second subset of the plurality of data packets in the one or more second buffers based at least in part on the indication of the one or more second buffers via the second transfer ring.~~

76. The method of claim 51, wherein the container is included among a plurality of containers to be transferred to the processor via the first interface channel; and

 wherein transferring the container via the first interface channel comprises:

 storing each of the plurality of containers in a respective buffer of the one or more first buffers in an order that is based at least in part on respective activity levels of the plurality of containers.

87. The method of claim 4, ~~further comprising:~~

~~providing, to the modem and using the processor, an indication of one or more buffers associated with the first interface channel,~~

 1, wherein the indication of the one or more buffers is provided in a coalescing transfer ring element via the first transfer ring, ~~and,~~

~~wherein the indication of the one or more buffers comprises:~~

~~an indication of a respective software cookie associated with each of the one or more buffers.~~

98. The method of claim 87, wherein transferring the container via the first interface channel comprises:

 storing the container across the one or more buffers; and

 providing, to the processor, using the modem, and based at least in part on storing the container, an indication of a coalescing completion event,

 wherein the indication of the coalescing completion event is provided via a shared event ring associated with the first interface channel and the second interface channel, and

 wherein the indication of the coalescing completion event identifies the respective software cookie associated with each of the one or more buffers and a coalescing context identifier associated with the container.

109. The method of claim 98, wherein transferring the second subset of the plurality of data packets comprises:

 providing an indication of a completion event to the processor and using the modem,

wherein the indication of the completion event is provided via the shared event ring, and

wherein the indication of the coalescing completion event and the indication of the completion event are ordered in the event ring based at least in part on an order in which the container and the second subset of the plurality of data packets were transferred to the processor.

1110. The method of claim 98, wherein storing the container across the one or more buffers comprises:

storing the container in a first buffer of the one or more buffers until the first buffer is filled; closing the first buffer based at least in part on the first buffer being filled; generating an event code and a context identifier associated with the first buffer; and storing a remainder of the container in a second buffer of the one or more buffers.

~~closing the first buffer based at least in part on the first buffer being filled;
generating an event code and a context identifier associated with the first buffer; and
storing a remainder of the container in a second buffer of the one or more buffers.~~

1211. The method of claim 1, wherein ~~the container is included among a plurality of containers;~~
and

~~wherein~~ transferring the container via the first interface channel comprises:

transferring the plurality of containers via the first interface channel,

wherein each of the plurality of containers is associated with a respective ~~transmission control protocol (TCP) connection or user datagram protocol (UDP) connection.~~

1312. The method of claim 1, wherein grouping the payloads of the first subset of the plurality of data packets into the container comprises:

determining that the first subset of the plurality of data packets are capable of being coalesced; and

grouping the payloads of the first subset of the plurality of data packets into the container based at least in part on determining that the first subset of the plurality of data packets are capable of being coalesced; and

wherein transferring the second subset of the plurality of data packets via the second interface channel comprises:

determining that the second subset of the plurality of data packets are not capable of being coalesced; and
transferring the second subset of the plurality of data packets via the second interface channel based at least in part on determining that the second subset of the plurality of data packets are not capable of being coalesced.

~~14~~13. The method of claim ~~13~~12, wherein grouping the payloads of the first subset of the plurality of data packets into the container comprises:

~~_~~closing the container; and
generating an event code and a context identifier associated with a buffer, of the one or more buffers, in which the container is to be stored.

~~15~~14. The method of claim ~~14~~13, wherein closing the container comprises at least one of:

~~_~~identifying a flag, included in a data packet of the first subset of the plurality of data packets, that indicates that the container is to be closed, or
determining that a data packet of the second subset of the plurality of data packets is not capable of being coalesced with the first subset of the plurality of data packets.

~~16~~15. The method of claim 1, further comprising:

~~_~~determining to transfer another container, of the plurality of containers, via the first interface channel; and
~~_~~closing the second interface channel based at least in part on determining to transfer the other container via the first interface channel.

~~17~~16. The method of claim 1, wherein the processor is:

~~_~~an application processor, or
a host processor; and
~~_~~wherein an interface, associated with the first interface channel and the second interface channel, is: a peripheral component interconnect express interface, a universal serial bus interface, a serial ATA interface, or an Ethernet interface.

~~a peripheral component interconnect express interface,~~
~~a universal serial bus interface,~~

~~a serial ATA interface, or~~
~~an Ethernet interface.~~

~~1817.~~ The method of claim 1, wherein the first subset of the plurality of data packets are associated with a same flow or a same stream; and the container includes a plurality of headers associated with the same flow or the same stream.

~~1918.~~ The method of claim 1, wherein grouping the payloads of the first subset of the plurality of data packets into the container comprises:

~~_receiving, at the modem and from the processor, an indication of at least one of a~~
~~threshold byte size for the container or a threshold quantity of data packets for the container; and~~
~~_grouping, at the modem, the payloads of the first subset of the plurality of data packets into the~~
~~container based at least in part on the at least one of the threshold byte size for the container or~~
~~the threshold quantity of data packets for the container.~~

~~2019.~~ The method of claim 1, wherein the first subset of the plurality of data packets comprises:

~~_a plurality of transmission control protocol (TCP) segments,~~
~~a plurality of user datagram protocol (UDP) packets,~~
~~_a plurality of Ethernet frames, or~~
a plurality of unstructured packets.

~~2120.~~ A device for wireless communication, comprising:

~~_a memory; and~~
~~_one or more processors operatively coupled to the memory, the memory and the one or~~
more processors configured to:
~~_receive a plurality of data packets at a modem of the device;~~
~~_group, at the modem of the device, payloads of a first subset of the plurality of~~
data packets into a container;
~~_of a plurality of containers associated with a transmission control protocol (TCP)~~
~~connection or user datagram protocol (UDP) connection; transfer, from the modem and to~~

a processor of the device ~~and using the modem~~ one or more processors, the container via a first interface channel; ~~and~~
associated with a first transfer ring; transfer, from the modem and to the processor and using the modem, a second subset of the plurality of data packets via a second interface channel, different from the first interface channel, associated with a second transfer ring different from the first transfer ring; and providing, to the modem and using the processor, an indication of one or more buffers associated with the first interface channel, wherein the indication of the one or more buffers comprises an indication of a respective software cookie associated with each of the one or more buffers.

~~2221.~~ The device of claim ~~2120~~, wherein the first subset of the plurality of data packets comprises:

~~_a plurality of transmission control protocol (TCP) segments associated with a same TCP flow,~~

wherein the container comprises:

~~_a coalesced TCP frame having a coalescing frame header; or~~

~~_wherein the first subset of the plurality of data packets comprises:~~

~~_a plurality of user datagram protocol (UDP) packets associated with a same UDP stream,~~

~~_wherein the container comprises:~~

~~_a grouped UDP datagram having a single UDP header.~~

~~2322.~~ The device of claim ~~2120~~, wherein the first subset of the plurality of data packets are associated with a same flow or a same stream; and
the container includes a plurality of headers associated with the same flow or the same stream.

~~2423.~~ The device of claim ~~2120~~, wherein the one or more processors, when grouping the payloads of the first subset of the plurality of data packets into the container, are configured to:

~~_receive, at the modem and from the processor, an indication of at least one of a threshold byte size for the container or a threshold quantity of data packets for the container; and~~

group, at the modem, the payloads of the first subset of the plurality of data packets into the container based at least in part on the at least one of the threshold byte size for the container or the threshold quantity of data packets for the container.

24. The device of claim 20, wherein a header associated with the container includes at least one of: a context identifier field that identifies a context identifier associated with the container, a checksum validity field that identifies whether a checksum error occurred for any of the plurality of data packets, a checksum error bitmap field that identifies, if a checksum error occurred for any of the plurality of data packets, one or more data packets of the plurality of data packets associated with the checksum error, a plurality of packet number packet length (NL) fields, wherein each NL field identifies a quantity of the plurality of data packets that are a same packet length, or an NL quantity field that identifies a quantity of NL fields included in the header.

25. A non-transitory computer-readable medium storing one or more instructions for communication, the one or more instructions comprising:

 one or more instructions that, when executed by one or more processors of a device, cause the one or more processors to:

 receive a plurality of data packets at a modem of the device;

 group, at the modem of the device, payloads of a first subset of the plurality of data packets into a container; of a plurality of containers associated with a transmission control protocol (TCP) connection or user datagram protocol (UDP) connection; transfer, from the modem and to a processor of the one or more processors, the container via a first interface channel associated with a first transfer ring; transfer, from the modem and to the processor, a second subset of the plurality of data packets via a second interface channel, different from the first interface channel, associated with a second transfer ring different from the first transfer ring; and provide, to the modem and using the processor, an indication of one or more buffers associated with the first interface channel, wherein the indication of the one or more buffers comprises an indication of a respective software cookie associated with each of the one or more buffers.

~~transfer, to a processor of the device and using the modem, the container via a first interface channel; and~~

~~transfer, to the processor and using the modem, a second subset of the plurality of data packets via a second interface channel.~~

26. The non-transitory computer-readable medium of claim 25, wherein the first subset of the plurality of data packets comprises: a plurality of TCP segments associated with a same TCP flow, wherein the container comprises: a coalesced TCP frame having a coalescing frame header;

or wherein the first subset of the plurality of data packets comprises: a plurality of UDP packets associated with a same UDP stream, wherein the container comprises: a grouped UDP datagram having a single UDP header.

~~a plurality of transmission control protocol (TCP) segments associated with a same TCP flow;~~

~~wherein the container comprises:~~

~~a coalesced TCP frame having a coalescing frame header; or~~

~~wherein the first subset of the plurality of data packets comprises:~~

~~a plurality of user datagram protocol (UDP) packets associated with a same UDP stream;~~

~~wherein the container comprises:~~

~~a grouped UDP datagram having a single UDP header.~~

27. The non-transitory computer-readable medium of claim 25, wherein the first subset of the plurality of data packets are associated with a same flow or a same stream; and the container includes a plurality of headers associated with the same flow or the same stream.

28. An apparatus for wireless communication, comprising:

means for receiving a plurality of data packets at a modem of the apparatus;

means for grouping, at the modem of the apparatus, payloads of a first subset of the plurality of data packets into a container;

of a plurality of containers associated with a transmission control protocol (TCP) connection or user datagram protocol (UDP) connection; means for transferring, from the modem and to a processor of the apparatus and using the modem, the container via a first interface channel; and

associated with a first transfer ring; means for transferring, from the modem and to the processor and using the modem, a second subset of the plurality of data packets via a second interface channel, different from the first interface channel, associated with a second transfer ring different from the first transfer ring; and means for providing, to the modem and using the processor, an indication of one or more buffers associated with the first interface channel, wherein the indication of the one or more buffers comprises an indication of a respective software cookie associated with each of the one or more buffers.

29. The apparatus of claim 28, wherein the first subset of the plurality of data packets comprises: a plurality of TCP segments associated with a same TCP flow, wherein the container comprises: a coalesced TCP frame having a coalescing frame header; or wherein the first subset of the plurality of data packets comprises: a plurality of UDP packets associated with a same UDP stream, wherein the container comprises: a grouped UDP datagram having a single UDP header.

~~a plurality of transmission control protocol (TCP) segments associated with a same TCP flow;~~

~~wherein the container comprises:~~

~~a coalesced TCP frame having a coalescing frame header; or~~

~~wherein the first subset of the plurality of data packets comprises:~~

~~a plurality of user datagram protocol (UDP) packets associated with a same UDP stream;~~

~~wherein the container comprises:~~

~~a grouped UDP datagram having a single UDP header.~~

30. The apparatus of claim 28, wherein the first subset of the plurality of data packets are associated with a same flow or a same stream; and the container includes a plurality of headers associated with the same flow or the same stream.