MTU between IOS and XR

An MTU or Maximum Transmission Unit defines the size of the largest packet (Protocol Date Unit) that the layer is allowed to transmit over an interface

Cisco IOS-XE MTU commands will include the following:
> Tag (VLAN) headers
> The L3 payload (including its headers)

When calculating the MTU, you should subtract the overhead. In the case of ethernet this is the **layer 2 header information** and FCS.

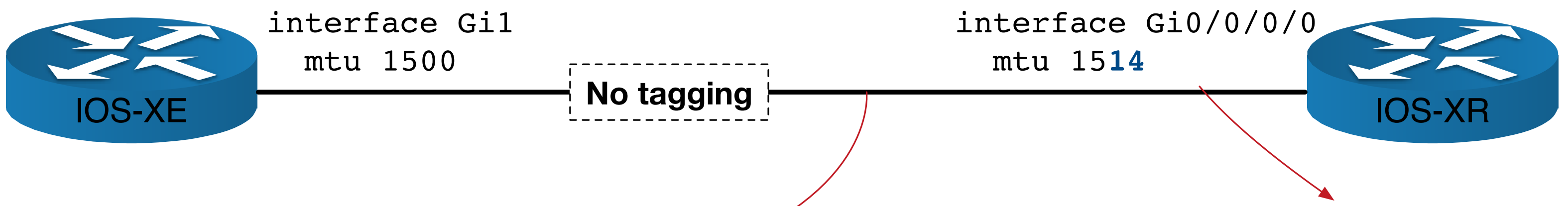
In Ethernet the maximum Frame size is 1518. If you subtract the overhead you get 1500. The breakdown is as follows:

1518 - Source MAC Address (6) - Destination MAC address (6) - EtherType (2) - FCS (4) = 1500

This results in equivalent IOS MTUs being 14 bytes smaller than IOS-XR MTUs.

Both IOS-XE and IOS-XR account for the FCS automatically so don't need to be considered when calculating MTU. Only IOS-XE accounts for the remaining layer 2 overhead.

Cisco IOS-XR MTU commands will include the following:
> **The Layer2 overhead excluding the FCS (4 bytes) and Frame Delimiter for ethernet frames**
> **Tag (VLAN) headers**
> **The L3 payload (including its headers)**



```
interface Gi1
 mtu 1500
```

```
interface Gi0/0/0/0
 mtu 1514
```

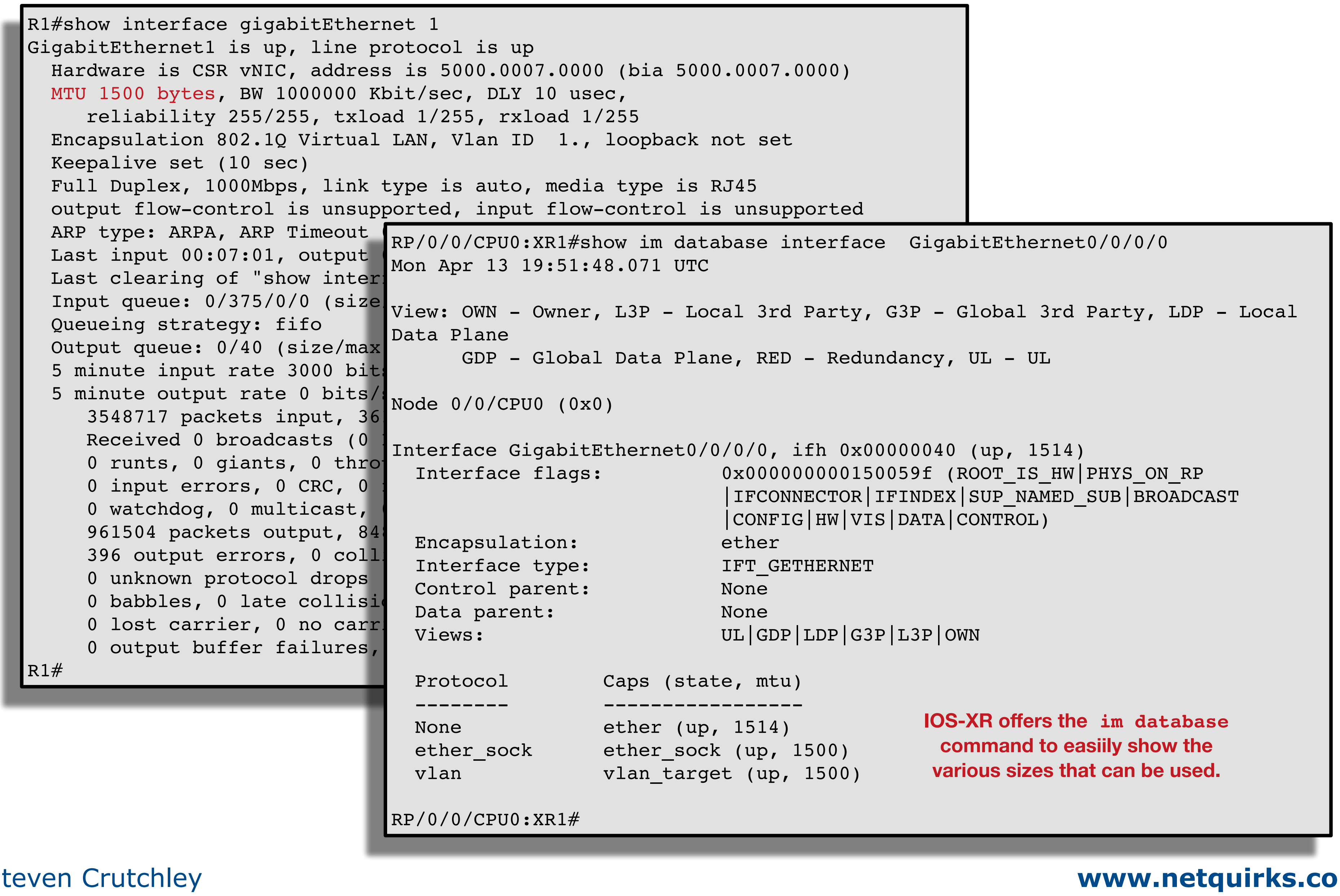
If this link was PPP or HDCP the IOS-XR side would be 1504 (which included the PPP or HDLC overhead) and the IOS-XE side would be 1500.

Layer 2 overhead excluding FCS and preamble = Source MAC Address (6) + Destination MAC address (6) + EtherType (2) = **14. As a result of this the default Ethernet (L2) MTU in Cisco IOS-XR is 1514 bytes.**

To enable the above link to carry one VLAN tag (802.1q, which is 4 bytes) and a packet of size 1500, change the MTUs to the following:

IOS: 1500 + 4 = 1504
XR = 1514 + 4 = 1518

Note that this adjustment to allow a VLAN tag enables the Layer 3 payload to remain at 1500 bytes. Without this adjustment, only Layer 3 frames up to a maximum size of 1496 could be sent - however hosts typically send packets with 1500 bytes of data so this is not recommended if you want to avoid fragmentation



```
R1#show interface gigabitEthernet 1
GigabitEthernet1 is up, line protocol is up
  Hardware is CSR vNIC, address is 5000.0007.0000 (bia 5000.0007.0000)
  MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation 802.1Q Virtual LAN, Vlan ID  1., loopback not set
  Keepalive set (10 sec)
  Full Duplex, 1000Mbps, link type is auto, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout
  Last input 00:07:01, output
  Last clearing of "show inter
  Input queue: 0/375/0/0 (size
  Queueing strategy: fifo
  Output queue: 0/40 (size/max
  5 minute input rate 3000 bit
  5 minute output rate 0 bits/
     3548717 packets input, 36
     Received 0 broadcasts (0
     0 runts, 0 giants, 0 thro
     0 input errors, 0 CRC, 0
     0 watchdog, 0 multicast,
     961504 packets output, 84
     396 output errors, 0 coll
     0 unknown protocol drops
     0 babbles, 0 late collisi
     0 lost carrier, 0 no carr
     0 output buffer failures,
R1#
```

```
RP/0/0/CPU0:XR1#show im database interface  GigabitEthernet0/0/0/0
Mon Apr 13 19:51:48.071 UTC

View: OWN - Owner, L3P - Local 3rd Party, G3P - Global 3rd Party, LDP - Local
Data Plane
      GDP - Global Data Plane, RED - Redundancy, UL - UL

Node 0/0/CPU0 (0x0)

Interface GigabitEthernet0/0/0/0, ifh 0x00000040 (up, 1514)
  Interface flags:          0x000000000150059f (ROOT_IS_HW|PHYS_ON_RP
                            |IFCONNECTOR|IFINDEX|SUP_NAMED_SUB|BROADCAST
                            |CONFIG|HW|VIS|DATA|CONTROL)
  Encapsulation:            ether
  Interface type:           IFT_GETHERNET
  Control parent:           None
  Data parent:              None
  Views:                    UL|GDP|LDP|G3P|L3P|OWN

  Protocol        Caps (state, mtu)
  --------        -----------------
  None            ether (up, 1514)
  ether_sock      ether_sock (up, 1500)
  vlan            vlan_target (up, 1500)

RP/0/0/CPU0:XR1#
```

IOS-XR offers the `im database` command to easiliy show the various sizes that can be used.

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