



Frame Size Support of Existing Ethernet Devices

As Observed in the UNH-IOL Ethernet
Test Beds



Presentation Goals:

- Report Results of Oversized Frame Testing
- Report Results of Multiple VLAN Tagged Frames
- Report Results of Multiple MPLS Tagged Frames



The Data Sample (1)

- Sample Data Collected from:
 - Devices within the UNH-IOL Test Bed
 - 141 Devices
 - 89 10/100BASE-T
 - » 23 Repeaters
 - 52 1000BASE-T and 1000BASE-X
 - Past MAC Test Suite Result Reports
 - 340 Gigabit Ethernet MAC Reports



The Data Sample (2)

- Data Collected from 83 Different Companies
 - System and Chip Vendors
 - Prototype and Shipping Equipment
- Device Age Breakdown

Year	Total	Year	Total
1995	3	2000	72
1996	5	2001	62
1997	20	2002	66
1998	71	2003	76
1999	57	2004	49



Test Procedure

- Both tagged and untagged oversized Ethernet frames were sent to the device.
- Frames were properly encoded with valid CRC32 values within the FCS Field.
- The largest frame size that elicited a response (frame reply or forward) was recorded.



Result Summary

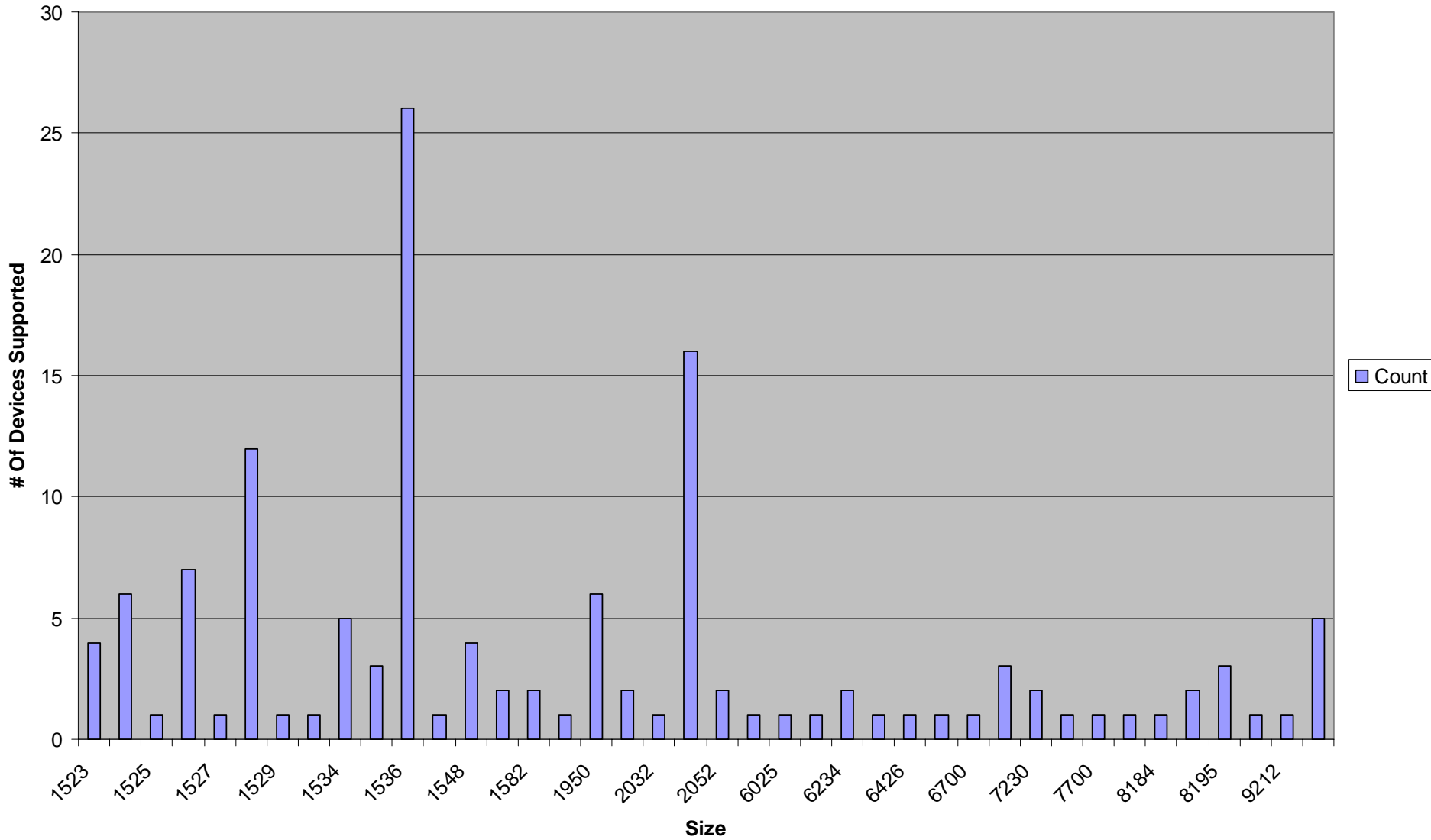
- Largest MaxFrameSize:
 - 9220 Bytes (tagged 9K frame)
- Smallest MaxFrameSize:
 - 1515 Bytes (but most common were 1518, 1519, 1522, 1523)
- Average Size Greater than MaxFrameSize:

	Untagged	Tagged
Mean	2559.71	3835.89
Median	1534	1560
Mode	1522	1536

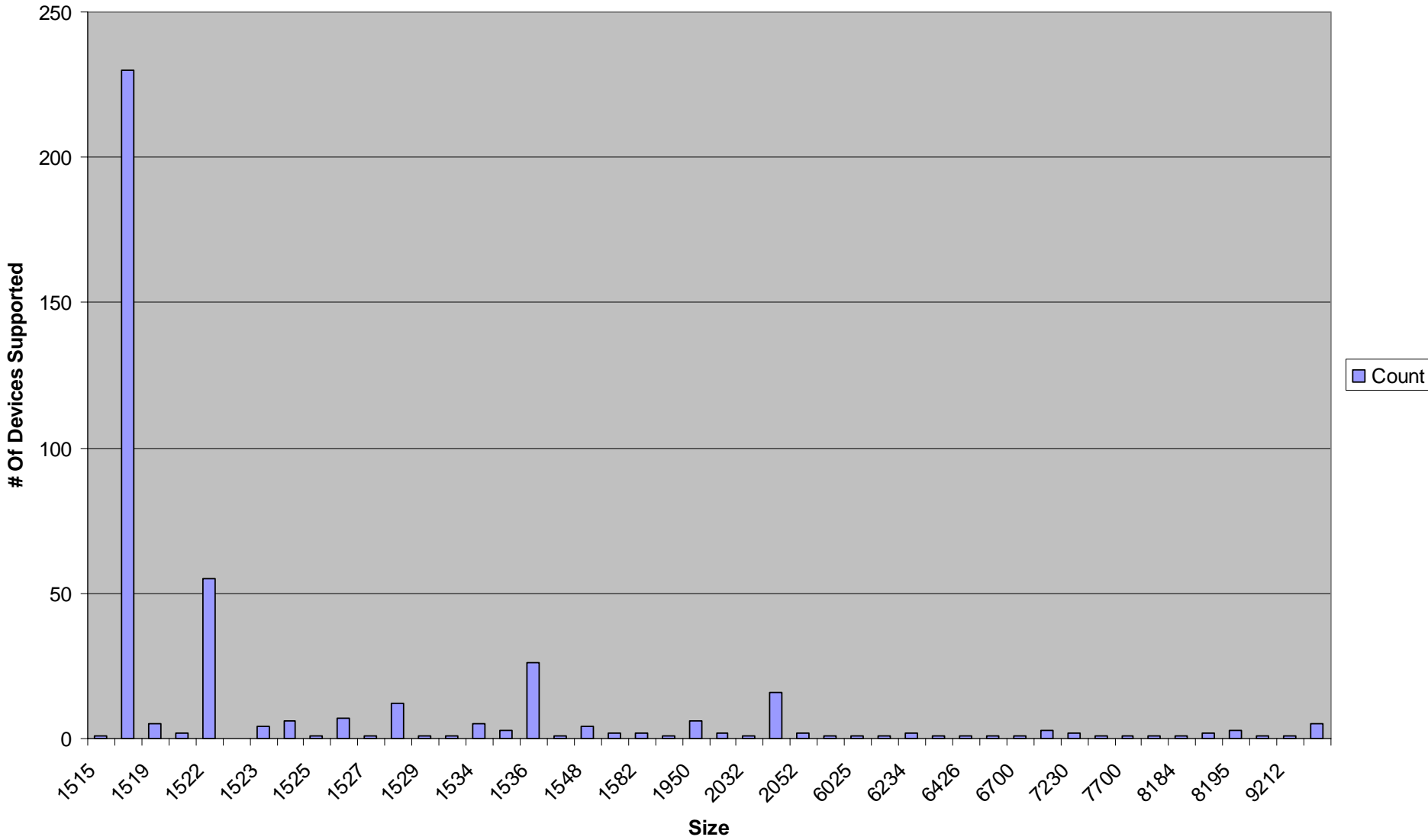
- Tagged results from those devices that accepted tagged frames
- All results come from devices using default configurations



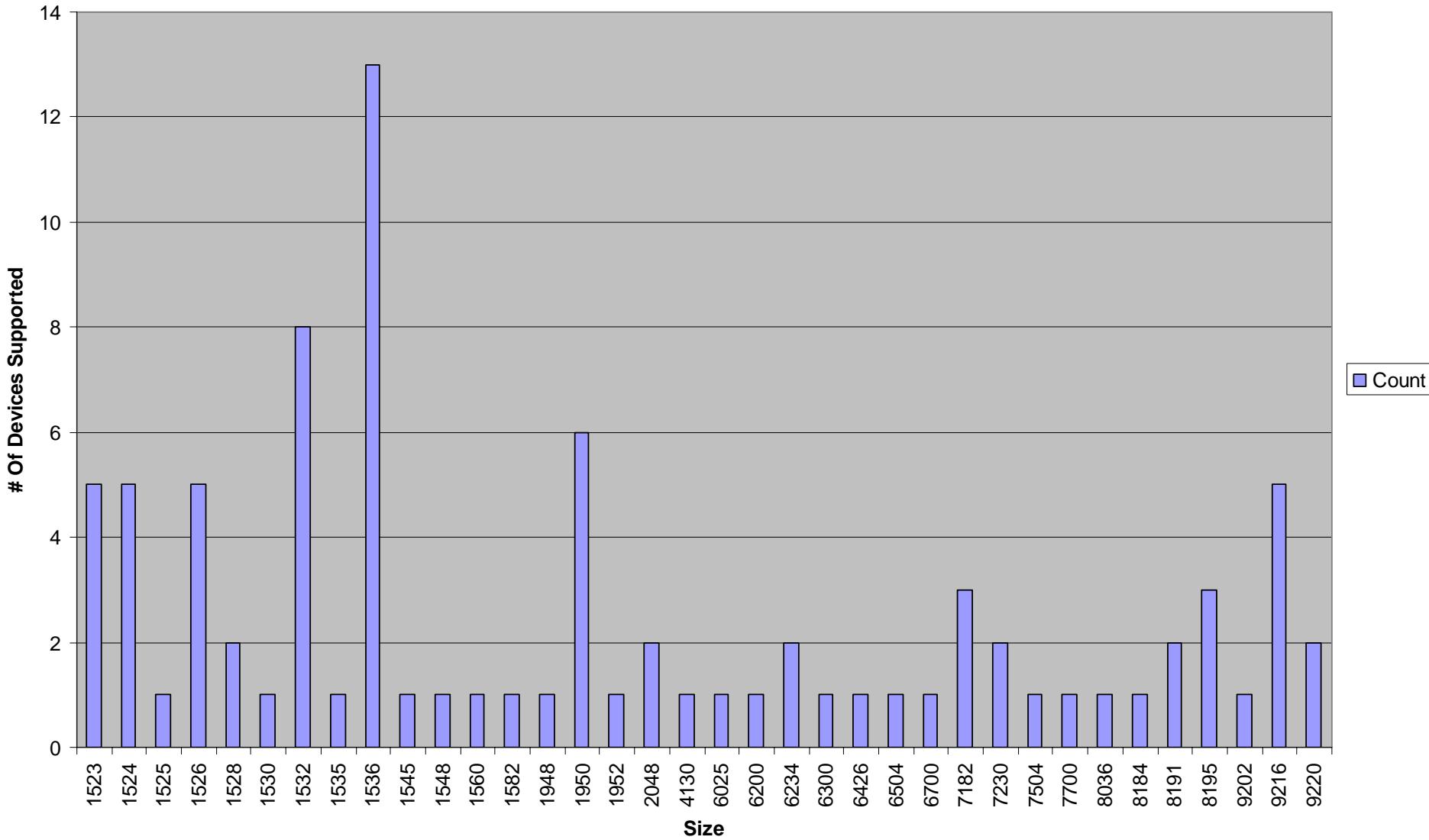
Untagged Frames Greater Than MaxFrameSize



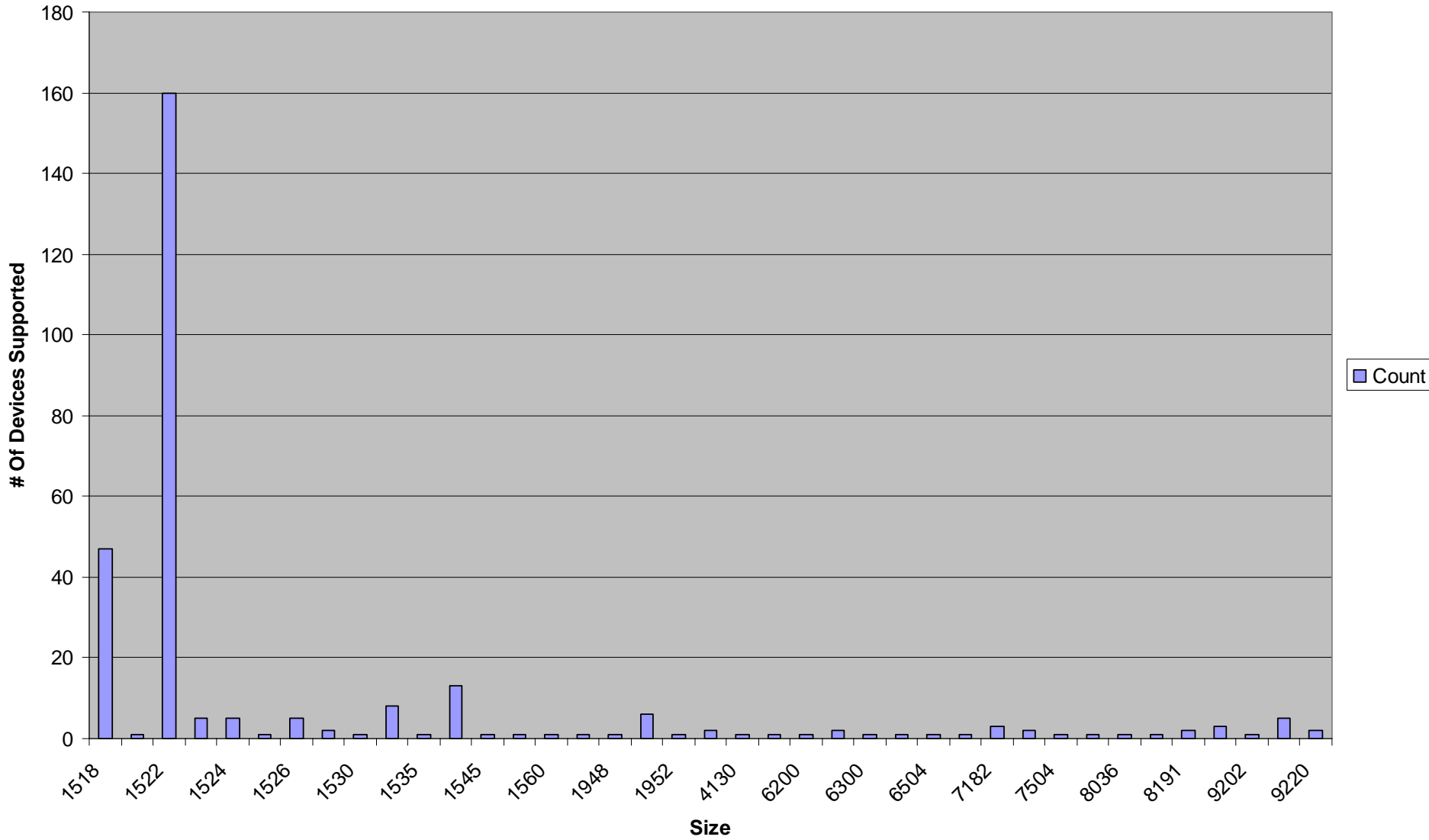
Untagged Frames Greater Than Or Equal To MaxFrameSize



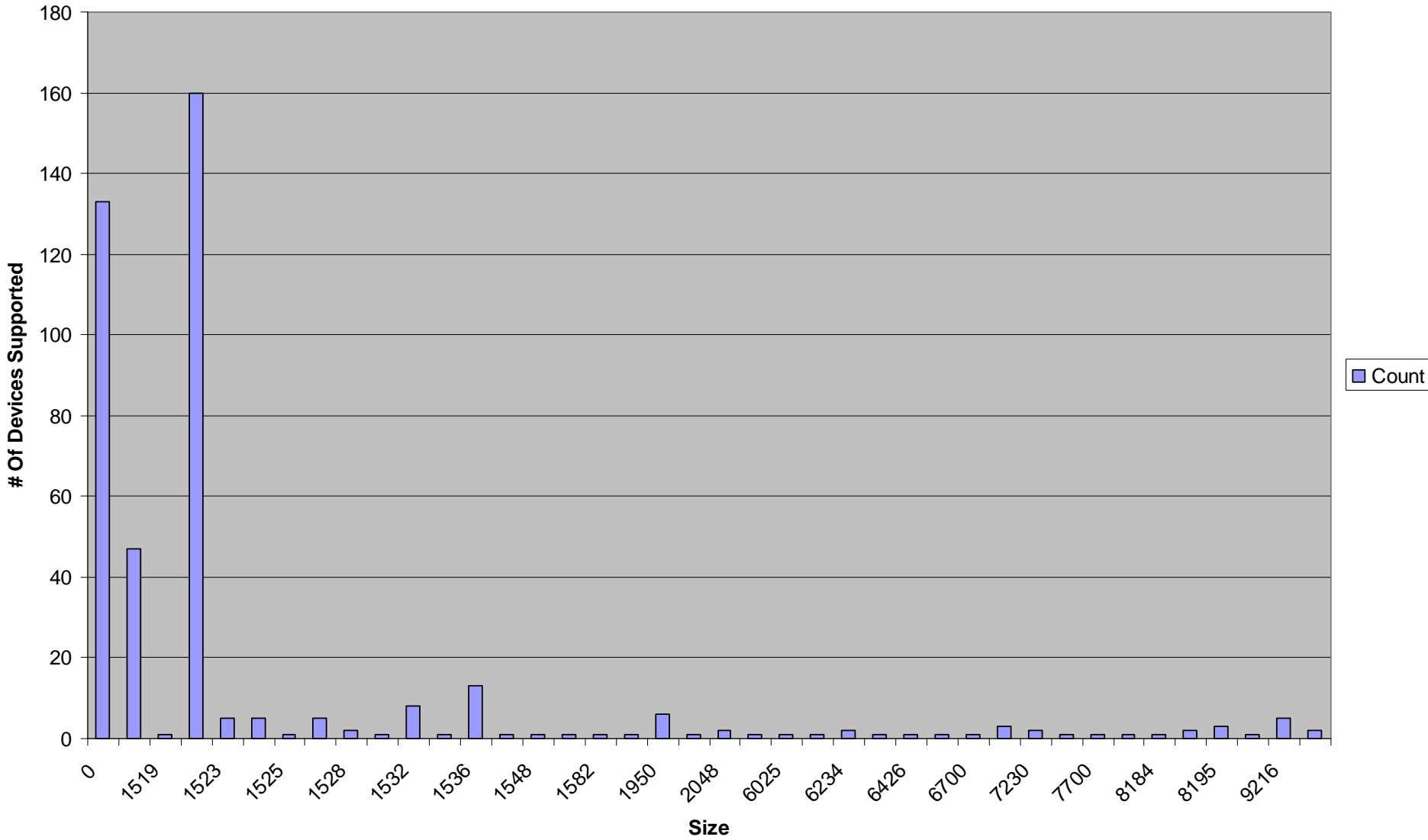
Tagged Frames Greater Than MaxFrameSize



Tagged Frames Greater Than Or Equal To MaxFrameSize



Tagged Frame Support



Observations (1)

- 31% of the devices tested supported untagged frames over maxFrameSize
- 69% of the devices tested supported tagged frames
 - Of that 29% of the devices tested supported tagged frames over maxFrameSize
- All repeaters tested accept at least a 4130 byte frame
- Largest frame received was from a bridging device



Observations (2)

- 23 devices responded by splitting the data within 2 frames
- For 3 devices, oversized frames (> 1528, 1543 bytes) adversely affected the reception of valid frames, however a device reboot was not necessary



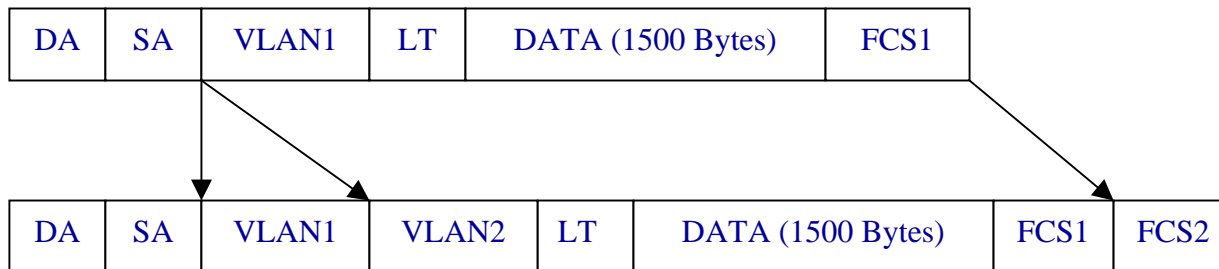
Additional Testing

- VLAN Double Tagging
- MPLS Wrapping



VLAN Double Tagging

- Double Tagged a Maximum Sized Frame
 - Stepped up the tagging if received by device



*format as described in martin_ar_1_0407.pdf



Result Summary

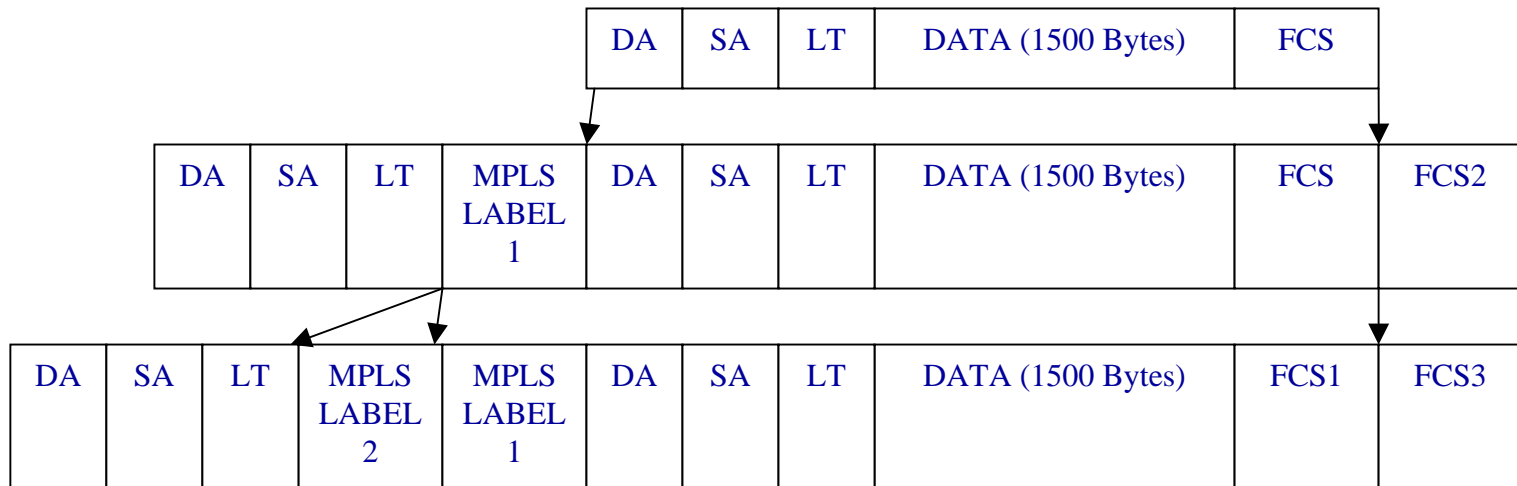
- 102 devices were tested
 - All observed to accept frames greater than 1518 bytes
 - 50 devices accepted multiple VLAN tags
 - 52 devices would not accept multiple VLAN tags
 - of these 41 devices accepted at least 1 VLAN tag

*All devices tested with default configuration



MPLS Wrapping

- MPLS Wrap a Maximum Sized Frame
 - Stepped up the number of labels if received by device



*format as described in martin_ar_1_0407.pdf



Result Summary

- 102 devices were tested
 - All observed to accept frames greater than 1518
 - 29 device accepted MPLS encapsulated frames
- 1 device required rebooting from the reception of a MPLS encapsulated frame

*All devices tested with default configurations



Thank You

Any Questions?

