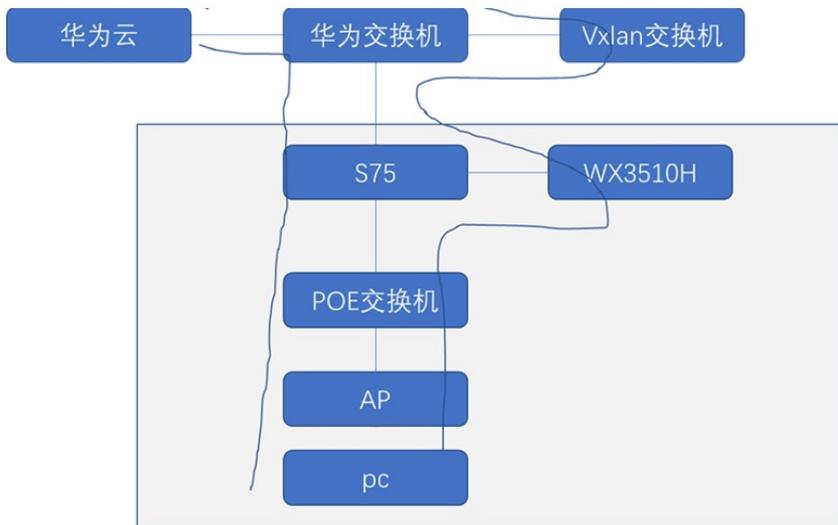


某据点访问华为云http业务卡顿问题处理

wlan接入 朱楷 2020-09-29 发表

组网及说明

组网环境:



问题背景:

终端通过wifi访问华为云服务器的web页面出现页面卡顿打不开的情况，同样环境下访问其他互联网网页都是正常的。

尝试换用本地转发和集中转发都是一样的效果。修改过用户网段int vlan 下的tcp mss 也都没有效果。但是有线PC访问又是正常的

问题描述

现场按照故障现象进行反复测试，使用V5 FAT AP遇到同样的故障效果，唯独AP全部vlan1的做法 网页打开速度很快。

现场做了两次实验:

V5 FAT AP 整机vlan1，通过POE交换机access vlan670控制，无线终端网页打开正常

V5 FAT AP 整机用vlan670，POE交换机trunk模式，无线终端打开网页卡顿。

过程分析

两次实验都做了服务器和PC侧的抓包。

我们先看http的流程，正常环境下

No.	Time	Source	Destination	Protocol	Length	Info
69	*REF*	10.190.224.233	10.138.25.4	HTTP	499	GET / HTTP/1.1
71	0.000198	10.138.25.4	10.190.224.233	HTTP	488	HTTP/1.1 200 OK (text/html)
73	0.157301	10.190.224.233	10.138.25.4	HTTP	396	GET /1111.png HTTP/1.1
83	0.157476	10.138.25.4	10.190.224.233	HTTP	1354	80 → 63511 [ACK] Seq=12135 Ack=788 Win=31360 Len=1300 [TCP segment of a retransmission (10.138.25.4 → 10.190.224.233) to 10.190.224.233:80: flags [ACK] win 0, length 1354, window 31360, byte range [63511-64865], option [TS val 1000000, snt 1000000, seq 12135, win 0, len 1354]]
84	0.159985	10.190.224.233	10.138.25.4	HTTP	396	GET /1112.png HTTP/1.1
239	0.176678	10.138.25.4	10.190.224.233	HTTP	308	HTTP/1.1 200 OK (PNG)
272	0.174336	10.190.224.233	10.138.25.4	HTTP	394	GET /bz.jpg HTTP/1.1
546	0.192385	10.138.25.4	10.190.224.233	HTTP	774	HTTP/1.1 200 OK (PNG)
861	0.233537	10.138.25.4	10.190.224.233	HTTP	310	HTTP/1.1 200 OK (JPEG) [truncated image]

测试业务是下载3张图片，每个图片都有交互成功的显示，并且从打开网页到最后完成大概历时0.2S 再看vlan670环境下的交互

No.	Time	Source	Destination	Protocol	Length	Info
49	*REF*	10.190.224.233	10.138.25.4	HTTP	499	GET / HTTP/1.1
51	0.000203	10.138.25.4	10.190.224.233	HTTP	488	HTTP/1.1 200 OK (text/html)
53	0.079201	10.190.224.233	10.138.25.4	HTTP	896	GET /1111.png HTTP/1.1
64	0.080743	10.190.224.233	10.138.25.4	HTTP	396	GET /1112.png HTTP/1.1
82	0.084976	10.190.224.233	10.138.25.4	HTTP	394	GET /bz.jpg HTTP/1.1
306	5.316002	10.138.25.4	10.190.224.233	HTTP	308	HTTP/1.1 200 OK (PNG)
646	43.318711	10.190.224.233	10.138.25.4	HTTP	584	GET / HTTP/1.1
648	43.318990	10.138.25.4	10.190.224.233	HTTP	233	HTTP/1.1 304 Not Modified
655	43.404773	10.190.224.233	10.138.25.4	HTTP	45	GET /1111.png HTTP/1.1
656	43.404899	10.138.25.4	10.190.224.233	HTTP	394	HTTP/1.1 206 Partial Content (image/png)
657	43.407239	10.190.224.233	10.138.25.4	HTTP	45	GET /bz.jpg HTTP/1.1
659	43.407360	10.138.25.4	10.190.224.233	HTTP	396	HTTP/1.1 206 Partial Content (image/jpeg)
664	43.477644	10.190.224.233	10.138.25.4	HTTP	45	GET /1111.png HTTP/1.1
675	43.478767	10.190.224.233	10.138.25.4	HTTP	45	GET /bz.jpg HTTP/1.1
935	52.767035	10.190.224.233	10.138.25.4	HTTP	60	[TCP Spurious Retransmission] Continuation

仅1112.png图片快速ok了，其他图片一直没有服务器回复ok 并且历时长达1分钟也没有成功。

看来图片1111.png的传输tcp交互肯定受到影响了，我们在wireshark用追踪tcp流的方式看看哪里出了

问题，先看正常情况下

The screenshot shows a Wireshark capture of a TCP stream (tcp_stream eq 2). The first packet is a GET request for /1111.png. The subsequent packets are ACKs, each arriving in order and within a short time interval, indicating a smooth flow of data without retransmissions or significant delays.

No.	Time	Source	Destination	Protocol	Length	Info
72	11.069301	10.190.224.233	10.138.25.4	TCP	60	63511 → 80 [ACK] Seq=446 Ack=435 Win=130816 Len=0
73	0.000153	10.190.224.233	10.138.25.4	HTTP	396	GET /1111.png HTTP/1.1
74	0.000158	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=435 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
75	0.000160	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=1735 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
76	0.000162	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=3035 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
77	0.000165	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=4335 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
78	0.000166	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=5635 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
79	0.000168	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=6935 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
80	0.000170	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=8235 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
81	0.000172	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=9535 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
82	0.000175	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=10835 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
83	0.003733	10.190.224.233	10.138.25.4	TCP	60	63511 → 80 [ACK] Seq=788 Ack=9035 Win=131328 Len=0
84	0.003738	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=13435 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
85	0.003740	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=14735 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
86	0.003742	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=16035 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
87	0.003743	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=17335 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
88	0.005727	10.190.224.233	10.138.25.4	TCP	60	63511 → 80 [ACK] Seq=788 Ack=13435 Win=131328 Len=0
89	0.005730	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=18635 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
90	0.005732	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=19935 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
91	0.005733	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [ACK] Seq=21235 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
92	0.005735	10.138.25.4	10.190.224.233	TCP	1354	80 → 63511 [PSH, ACK] Seq=22535 Ack=788 Win=31360 Len=1300 [TCP segment of a re...

TCP的报文传输看起来很顺畅，没有重传和延迟。

Trunk模式下

The screenshot shows a Wireshark capture of a TCP stream (tcp_stream eq 2) in Trunk mode. The first packet is a GET request for /1111.png. The subsequent packets are ACKs, but there is a significant delay between the first ACK (Seq=446) and the final ACK (Seq=13435). The final ACK is highlighted in red, indicating a long delay in its receipt.

No.	Time	Source	Destination	Protocol	Length	Info
52	7.087110	10.190.224.233	10.138.25.4	TCP	60	64828 → 80 [ACK] Seq=446 Ack=435 Win=130816 Len=0
53	*REF*	10.190.224.233	10.138.25.4	HTTP	396	GET /1111.png HTTP/1.1
54	0.000097	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=435 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
55	0.000101	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=1735 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
56	0.000103	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=3035 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
57	0.000105	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=4335 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
58	0.000108	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=5635 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
59	0.000109	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=6935 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
60	0.000112	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=8235 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
61	0.000114	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=9535 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
62	0.000115	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=10835 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
63	0.000117	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=12135 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
64	0.003223	10.190.224.233	10.138.25.4	TCP	60	64828 → 80 [ACK] Seq=788 Ack=13435 Win=131328 Len=0
65	0.049925	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=13435 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
66	0.053767	10.190.224.233	10.138.25.4	TCP	60	64828 → 80 [ACK] Seq=788 Ack=14735 Win=130048 Len=0
67	0.274942	10.138.25.4	10.190.224.233	TCP	1354	[TCP Spurious Retransmission] 80 → 64828 [ACK] Seq=435 Ack=788 Win=31360 ...
68	0.280447	10.190.224.233	10.138.25.4	TCP	66	[TCP Dup ACK 99#1] 64828 → 80 [ACK] Seq=788 Ack=14735 Win=130048 Len=0 SL...
69	0.280458	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=14735 Ack=788 Win=31360 Len=1300 [TCP segment of a re...

前面服务器发送1300字节的tcp报文流程类似，但是当终端ACK完之后，服务器长达0.04S没有后续报文发送

0.049秒发送的报文也就1个tcp，按照正常流程会有至少6个tcp发送才算ok，在上一个交互中服务器从收到第一个1111.png请求到完成总共用时不到0.03S

同样角度看终端网卡自己的抓包有类似的现象。

The screenshot shows a Wireshark capture of a TCP stream (tcp_stream eq 15) at the terminal side. The first packet is a GET request for /1111.png. The subsequent packets are ACKs, but there is a significant delay between the first ACK (Seq=446) and the final ACK (Seq=13435). The final ACK is highlighted in red, indicating a long delay in its receipt.

No.	Time	Source	Destination	Protocol	Length	Info
322	1.771059	10.190.224.233	10.138.25.4	TCP	54	64828 → 80 [ACK] Seq=446 Ack=435 Win=130816 Len=0
323	*REF*	10.190.224.233	10.138.25.4	HTTP	396	GET /1111.png HTTP/1.1
325	0.001365	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=435 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
326	0.001898	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=1735 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
327	0.001900	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=3035 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
328	0.001901	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=4335 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
329	0.001906	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=5635 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
330	0.001907	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=6935 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
331	0.001909	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=8235 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
332	0.001909	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=9535 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
333	0.001910	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=10835 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
334	0.001911	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=12135 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
335	0.002379	10.190.224.233	10.138.25.4	TCP	54	64828 → 80 [ACK] Seq=788 Ack=13435 Win=131328 Len=0
336	0.051358	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=13435 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
337	0.093683	10.190.224.233	10.138.25.4	TCP	54	64828 → 80 [ACK] Seq=788 Ack=14735 Win=130048 Len=0
424	0.280285	10.138.25.4	10.190.224.233	TCP	1354	[TCP Spurious Retransmission] 80 → 64828 [ACK] Seq=435 Ack=788 Win=31360 ...
425	0.280289	10.190.224.233	10.138.25.4	TCP	66	[TCP Dup ACK 82#1] 64828 → 80 [ACK] Seq=788 Ack=14735 Win=130048 Len=0
426	0.281734	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=14735 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
427	0.282483	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=16035 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
428	0.282485	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=17335 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
429	0.282411	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=18635 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
430	0.282412	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=19935 Ack=788 Win=31360 Len=1300 [TCP segment of a re...
431	0.282414	10.138.25.4	10.190.224.233	TCP	1354	80 → 64828 [ACK] Seq=21235 Ack=788 Win=31360 Len=1300 [TCP segment of a re...

终端回复完之后服务器的下一次报文需要经过0.05S左右才到达终端。

到这里为止可见的分析看上去是服务器回复报文慢了，至于再细节的根因还需要再挖掘分析。目前还没有好的切入点能和Vlan tag关联起来。

解决方法

最后在厂商之间共同的努力下发现了问题的真正答案：

Wi-Fi慢的问题触发原因已经找到了，是Wi-Fi发出来的ack报文比标准的64字节小（只有54字节），而有线发出来的ack报文经过交换机补全是64字节，这种54字节的报文长度会影响云上网关处理不兼容，属于服务器的性能BUG。服务器厂商会优化处理这方面的性能问题。