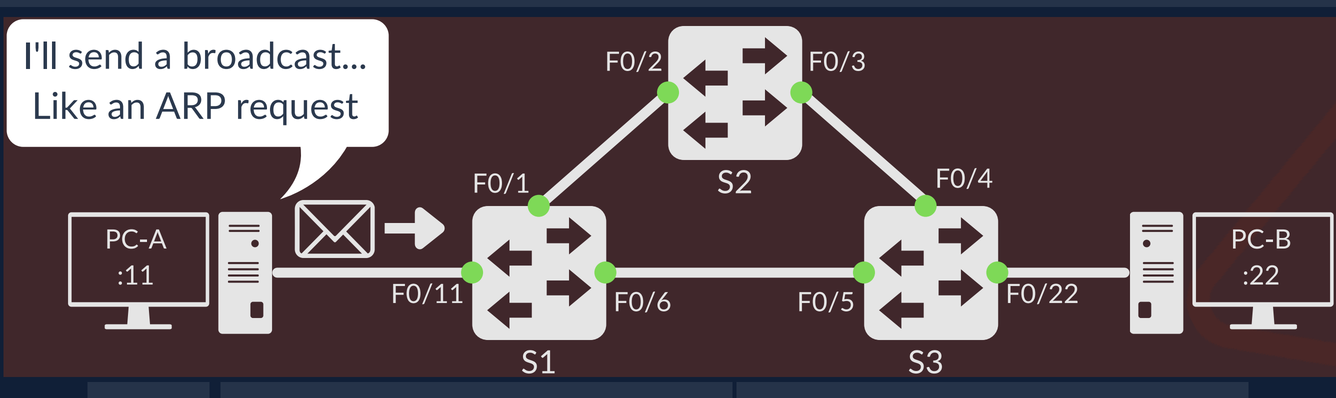
THE LOGIC BEHIND

Spanning Tree Protocol

THE PERFECT STORM

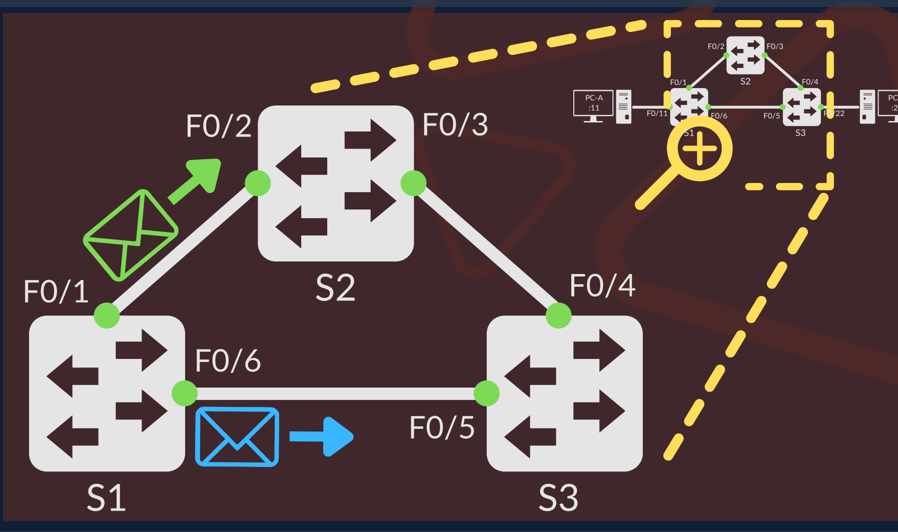
A broadcast frame is sent from PC-A to broadcast mac address :FF. When S1 received this frame it will populate the Mac-Address-Table, linking PC-A's Mac Address with interface F0/11 where it is connected. S1 then duplicates the frame and "Floods" it out all active interfaces except the one it came from.



	Physical Address	Interface
S1	:11	F0/11

S2 and S3 receive the frames and populate their Mac-Address-Tables accordingly. Like S1 they will now duplicate the frame and flood them.

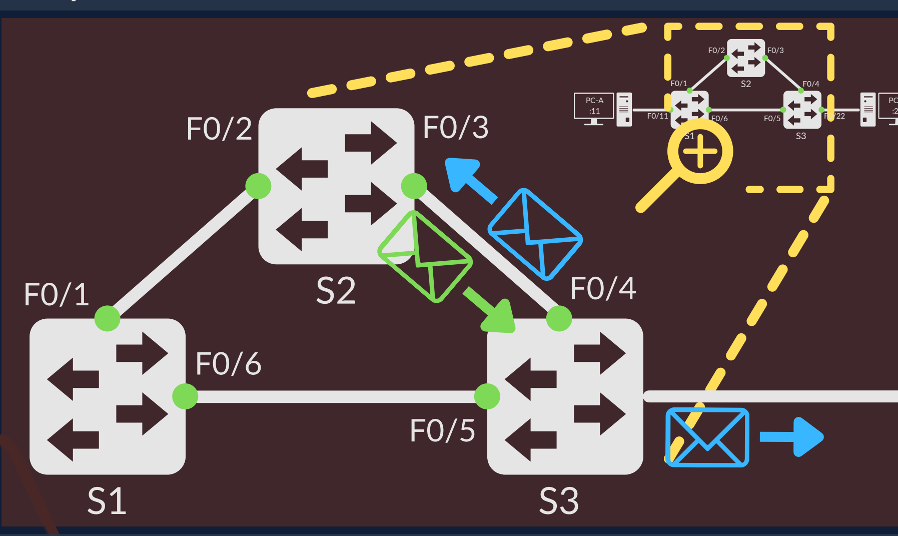
	Physical Address	Interface
S1	:11	F0/11
S2	:11	F0/2
S3	:11	F0/5



The problem with looped topologies now become clear. Focus on the Green Frame received by S3. The frame source MAC address is :11 (PC-A) and is received on F0/4.

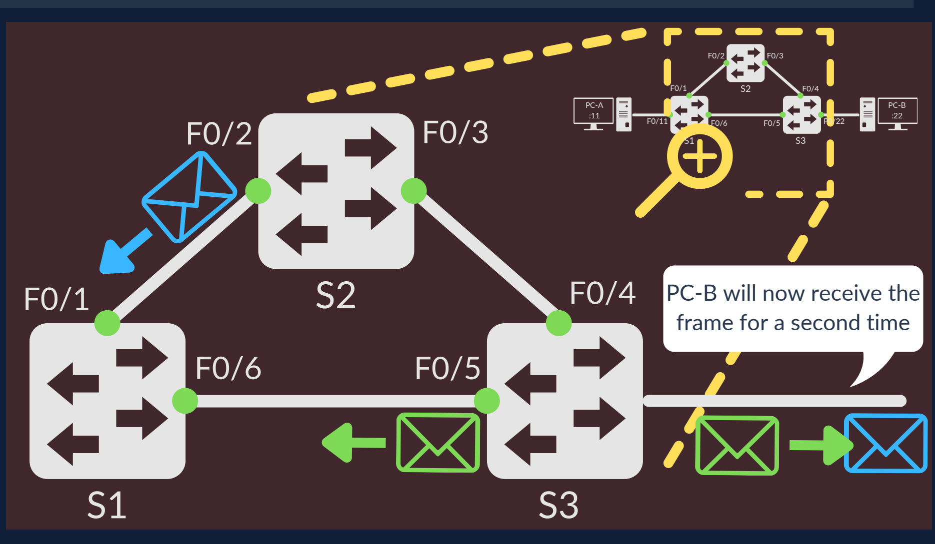
S3 believes this latest information is the more accurate and updates its MAC table, removing the old entry in the process. S2 does the same, respectively. The frames are duplicated and flooded.

	Physical Address	Interface
S1	:11	F0/11
S2	~~:11~~	~~F0/2~~
	:11	F0/3
S3	~~:11~~	~~F0/5~~
	:11	F0/4



S1 receives copies of Blue and Green frames it originally duplicated. Assuming their arrival is Blue then Green the mac table will look like displayed. Mac Table instability is born. but the worst is yet to come...

	Physical Address	Interface
S1	~~:11~~	~~F0/11~~
	~~:11~~	~~F0/1~~
	:11	F0/6
S2	:11	F0/3
S3	:11	F0/4

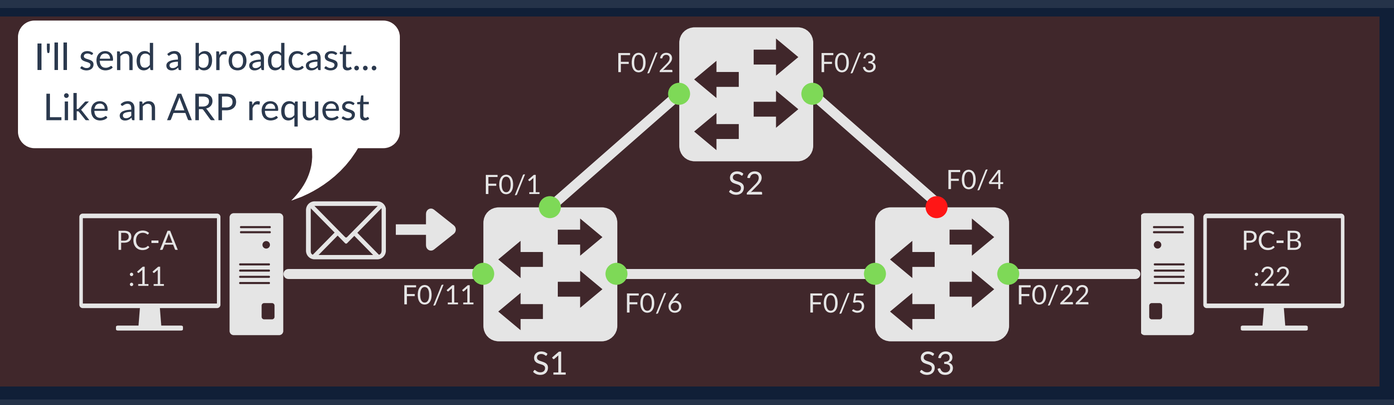


S1 will receive the Blue frame (update the mac table) duplicate it and flood. Then receive the Green frame (update the mac table) duplicate it and flood. The whole ugly process start over

STOPPING THE STORM

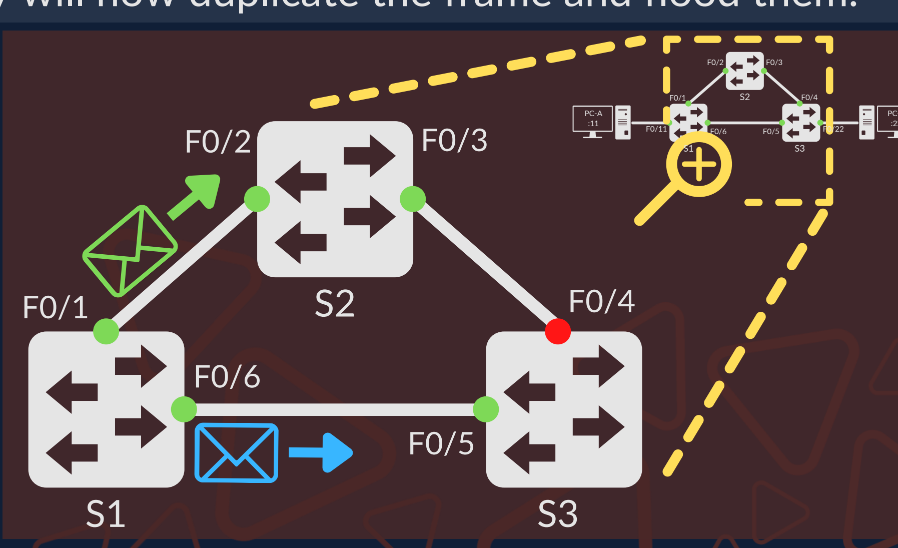
Now, rewind, start again, but this time STP is running. It has detected that the 3 switches connect and have formed a dangerous loop.

As a result of an election and some calculations, STP has decided that a single interface should be put into a blocking state. F0/4 on S3



Like before, S2 and S3 receive the frames and populate their Mac-Address-Tables accordingly. Like S1 they will now duplicate the frame and flood them.

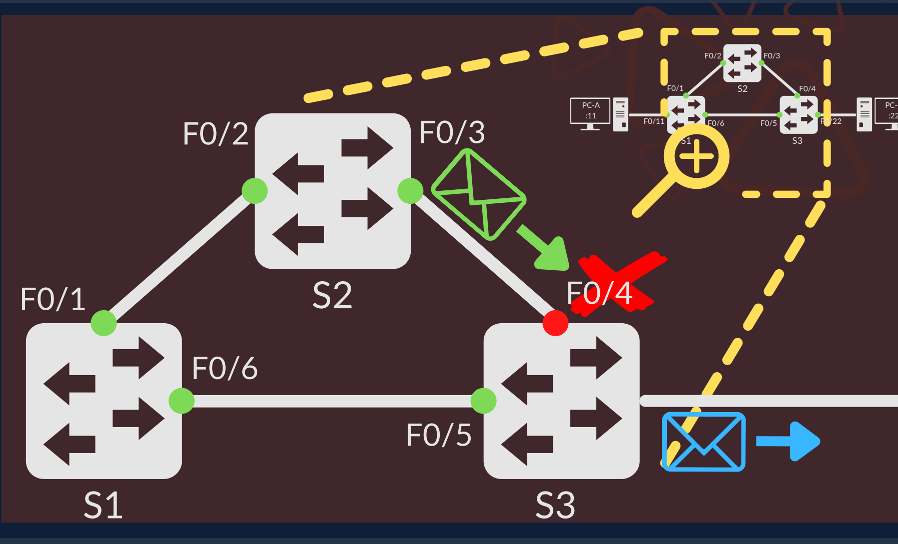
	Physical Address	Interface
S1	:11	F0/11
S2	:11	F0/2
S3	:11	F0/5



Previously at this stage the Mac table started to fluctuate. With F0/4 in a blocking state, the Green Frame sent by S2, will be dropped by S3 and no change will be mad to the Mac Table.

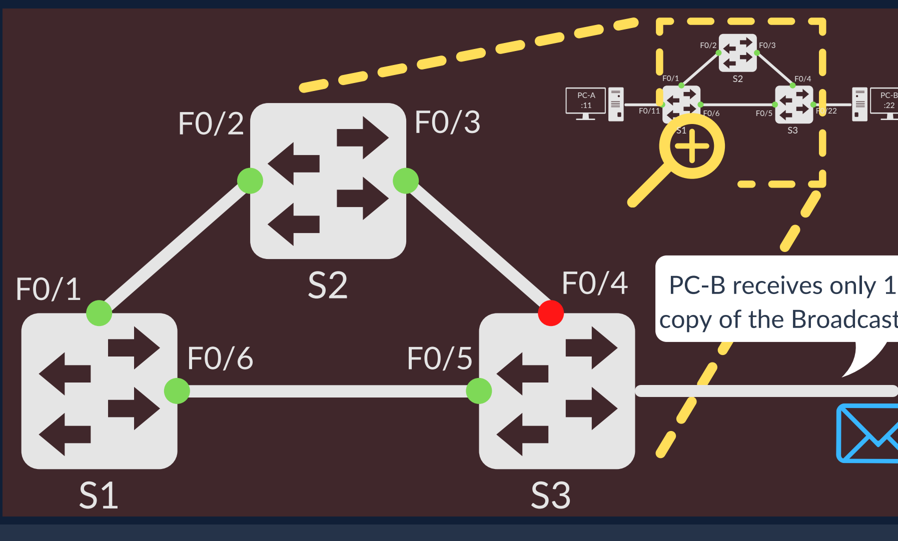
S3 will still duplicate and flood the Blue Frame, but as F0/4 is inactive, a frame will be forwarded out of it. Resulting in the broadcast only being sent to PC-B.

	Physical Address	Interface
S1	:11	F0/11
S2	:11	F0/2
S3	:11	F0/5



With S2 and S3 having processed everything, the broadcast frame has now been fully processed by all devices on the network once and is no longer in circulation of the network.

	Physical Address	Interface
S1	:11	F0/11
S2	:11	F0/2
S3	:11	F0/5



The Mac Address Tables on all 3 switches are now consistent and not fluctuating on a frame-by-frame basis.

Should something happen to the link between S1 and S3, STP will be able to detect that these two devices are no longer able to communicate and automatically bring the blocked interface into an active state. updating the MAC table accordingly

	Physical Address	Interface
S1	:11	F0/11
S2	:11	F0/2
S3	~~:11~~	~~F0/5~~
	:11	F0/4