

The Root Bridge Election



- Because Spanning Tree selects paths pointing towards the root bridge, it acts as a centre point of the LAN
- Best practice is to ensure a pair of high-end core switches are selected as the 1st and 2nd most preferred Root Bridge

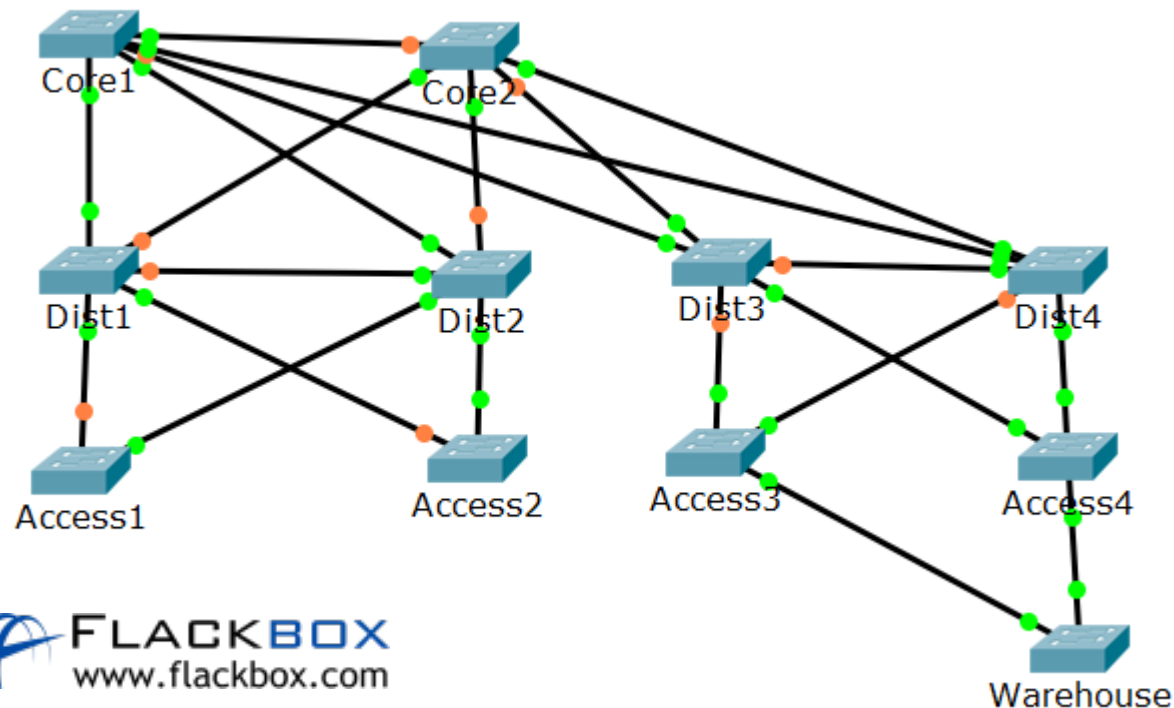
The Root Bridge Election



- You can manipulate the Root Bridge election by setting Bridge priority
- The default value is 32768, with the lowest number being most preferred
- In the case of a tie the switch with the lowest MAC address will be selected
- This is liable to be the oldest switch

Suboptimal Root Bridge

- All switches are left with the default Bridge Priority in this example
- The switch with the lowest MAC address becomes the Root Bridge
- This is the old switch in the warehouse
- It has low bandwidth links and limited CPU and memory



Suboptimal Root Bridge

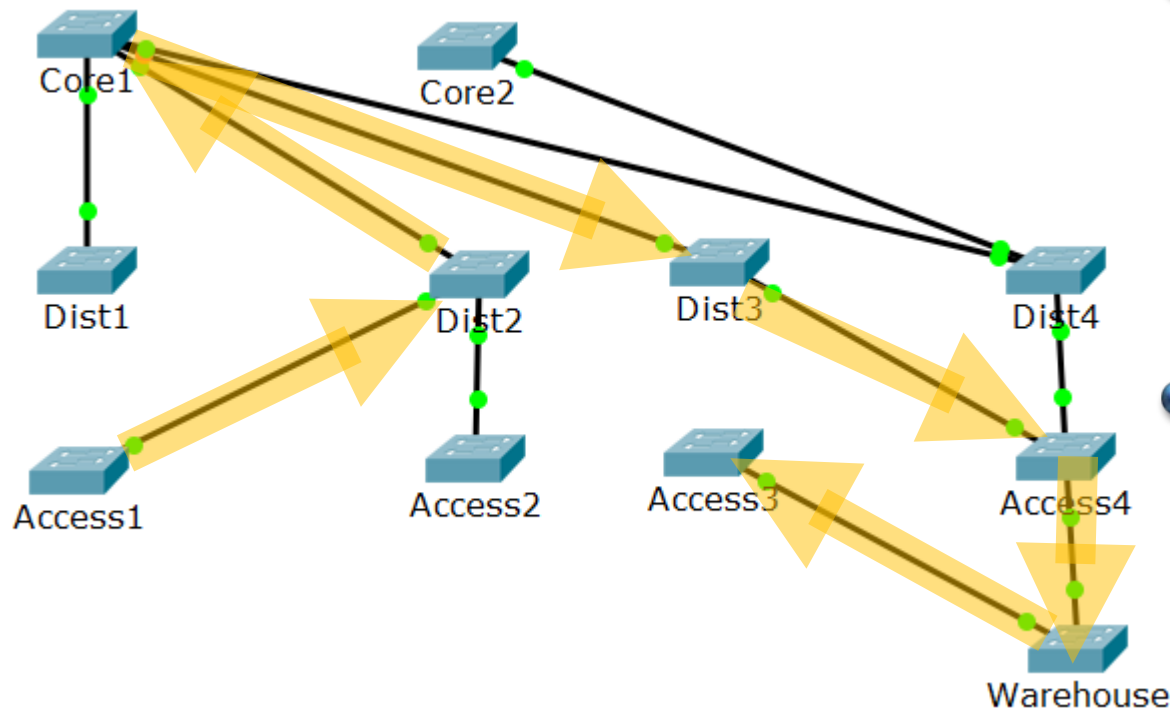


```
Warehouse#show spanning-tree vlan 1
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
             Address     0001.634B.E247
             This bridge is the root
             Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
             Address     0001.634B.E247
             Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time 20
```

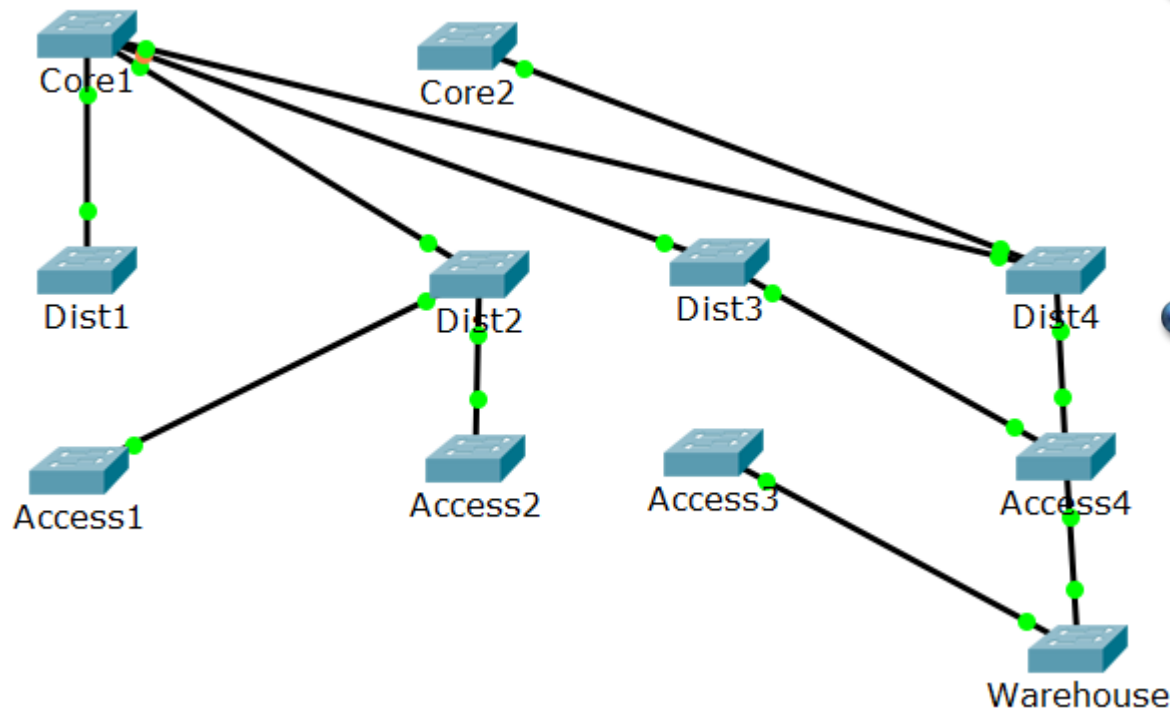
Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Desg	FWD	19	128.1	P2p
Fa0/2	Desg	FWD	19	128.2	P2p

Suboptimal Root Bridge



- Traffic from a PC connected to Access1 to another PC connected to Access3 goes along the path Acc1 > Dist2 > Core1 > Dist4 > Acc4 > Warehouse > Acc3
- This is 7 hops, including through the old switch in the warehouse

Suboptimal Root Bridge

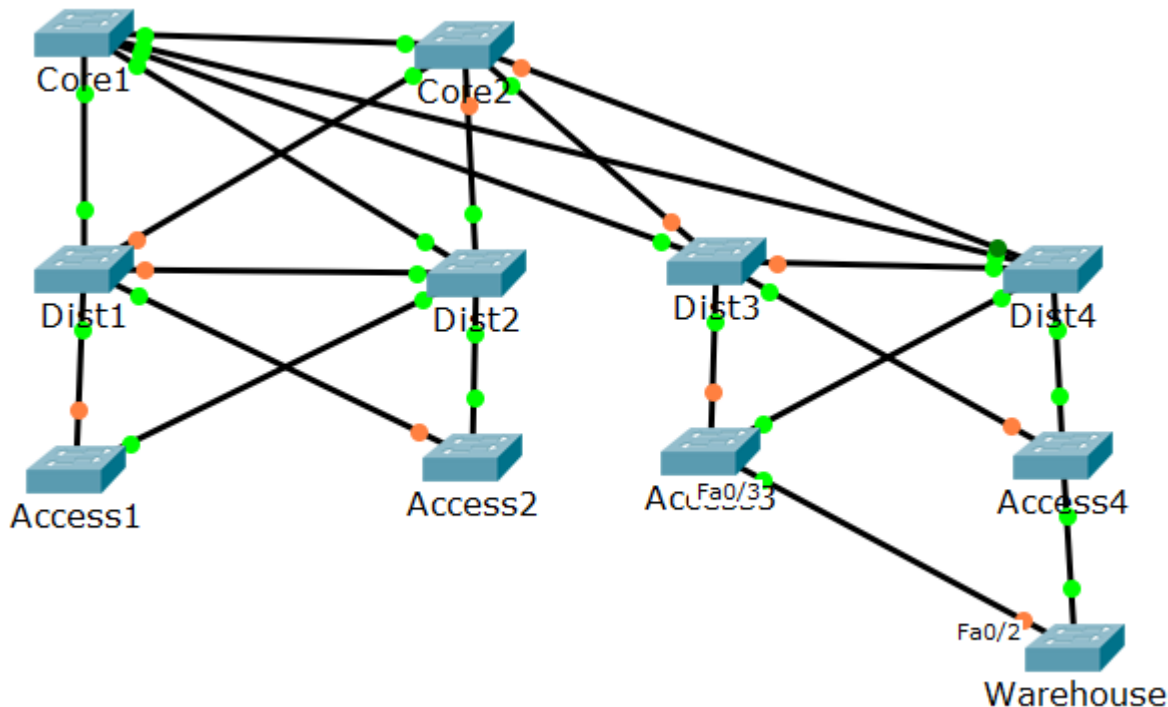


- All traffic between different pairs of distribution switches will go over an indirect path and transit the old switch in the warehouse
- This is likely to congest its links, CPU and RAM and will lead to suboptimal performance

Root Bridge Primary Configuration

```
Core1(config)#spanning-tree vlan 1 root primary
```

- Configures the Core1 switch to be the Root Bridge
- This will set a Bridge Priority of 24576



Root Bridge Primary Verification

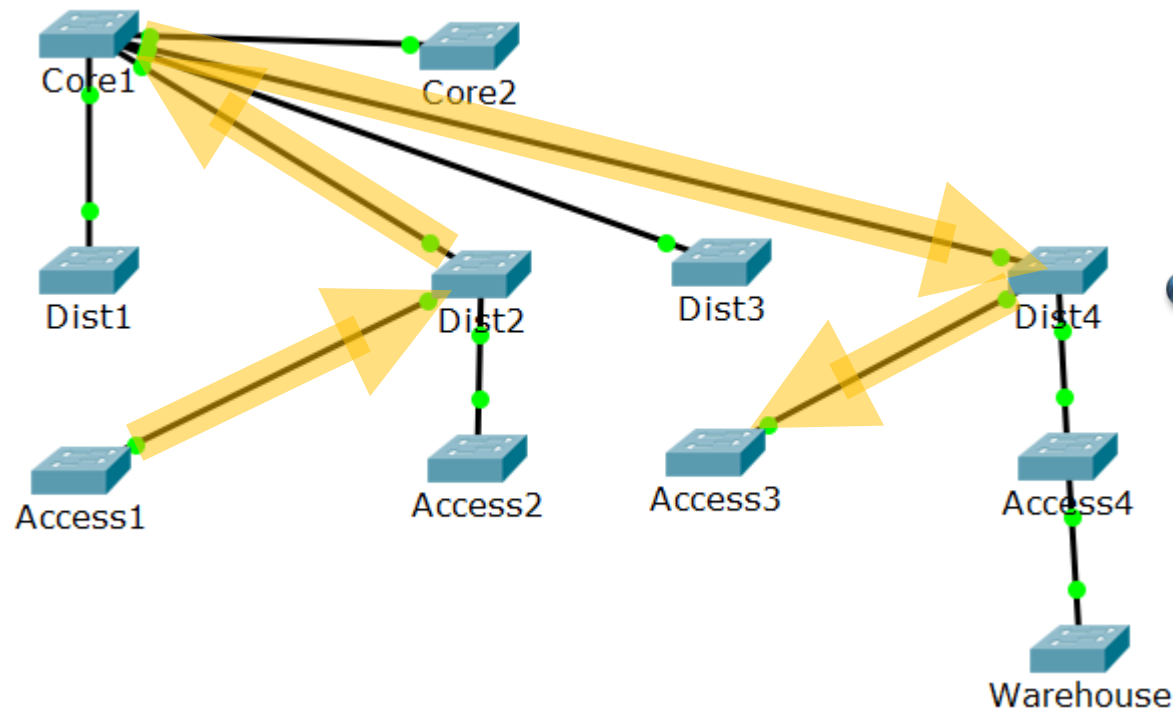


```
Core1#show spanning-tree vlan 1
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    24577
             Address     0090.0CA0.3902
             This bridge is the root
             Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    24577 (priority 24576 sys-id-ext 1)
             Address     0090.0CA0.3902
             Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time 20
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi0/2	Desg	FWD	4	128.26	P2p
Fa0/21	Desg	FWD	19	128.21	P2p
Fa0/24	Desg	FWD	19	128.24	P2p

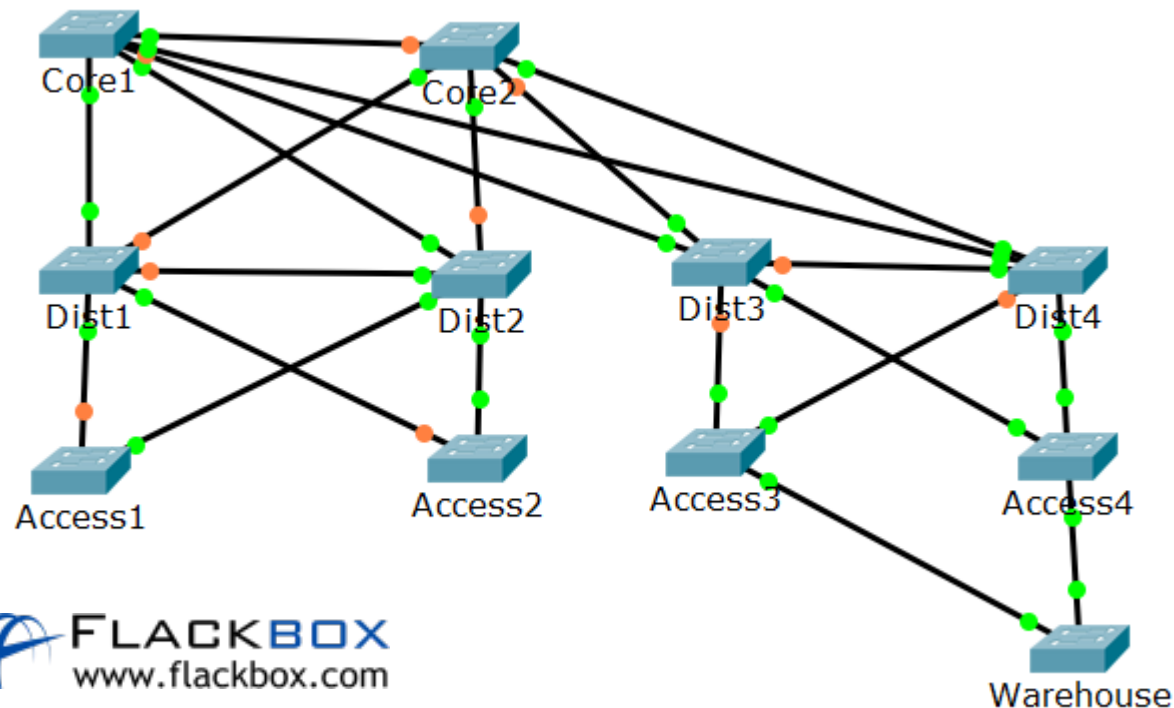
Optimal Root Bridge



- Traffic from a PC connected to Access1 to another PC connected to Access3 goes along the path Acc1 > Dist2 > Core1 > Dist4 > Acc3
- This is 5 hops along the most direct path through the core

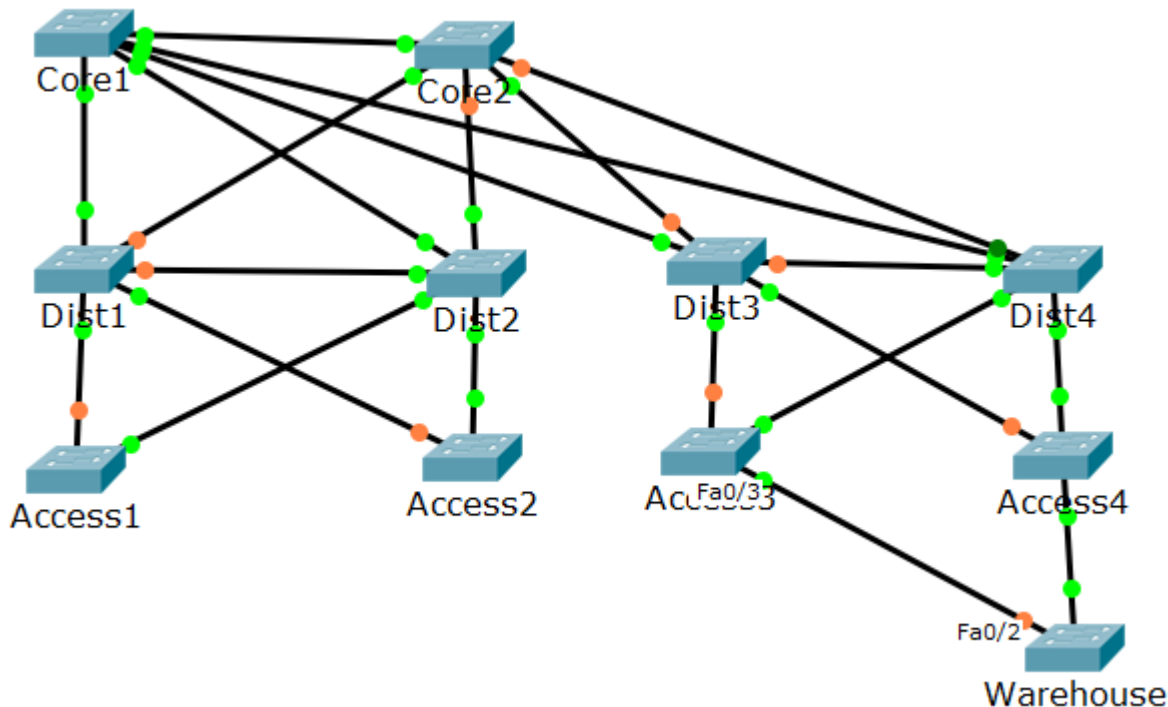
Root Bridge Failover

- If the Core1 switch fails, we want to ensure traffic still goes through the most direct centralised path
- We need to configure Core2 to be next most preferred as the Root Bridge



Root Bridge Secondary Configuration

```
Core2(config)#spanning-tree vlan 1 root secondary
```



- Configures the Core2 switch to be the next most preferred Root Bridge after Core1
- This will set a Bridge Priority of 28672

Root Bridge Secondary Verification



```
Core2#show spanning-tree vlan 1
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    24577
           Address    0090.0CA0.3902
           Cost      4
           Port      26(GigabitEthernet0/2)
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID   Priority    28673 (priority 28672 sys-id-ext 1)
           Address    0090.0C16.7A9B
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 20
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/24	Desg	FWD	19	128.24	P2p
Fa0/21	Desg	FWD	19	128.21	P2p
Gi0/2	Root	FWD	4	128.26	P2p