

# Lecture 8c - Spanning Tree Protocol - Advanced

Type

Lecture

Materials

Empty

Reviewed

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## 1. List of Spanning Tree Protocols

### 2. PVST+

#### 2.1 Overview of PVST+

- STP only maintains one Spanning Tree for the entire network
- With PVST+, we run an independent IEEE 802.1D STP instance for each VLAN in the network
- Pros:
  - Utilisation of previously unused links
  - Better load balancing of traffic
- Cons:
  - More CPU usage to calculate spanning-tree for each VLAN
  - More bandwidth lost as we have a unique BPDU for each VLAN

## 1. List of Spanning Tree Protocols

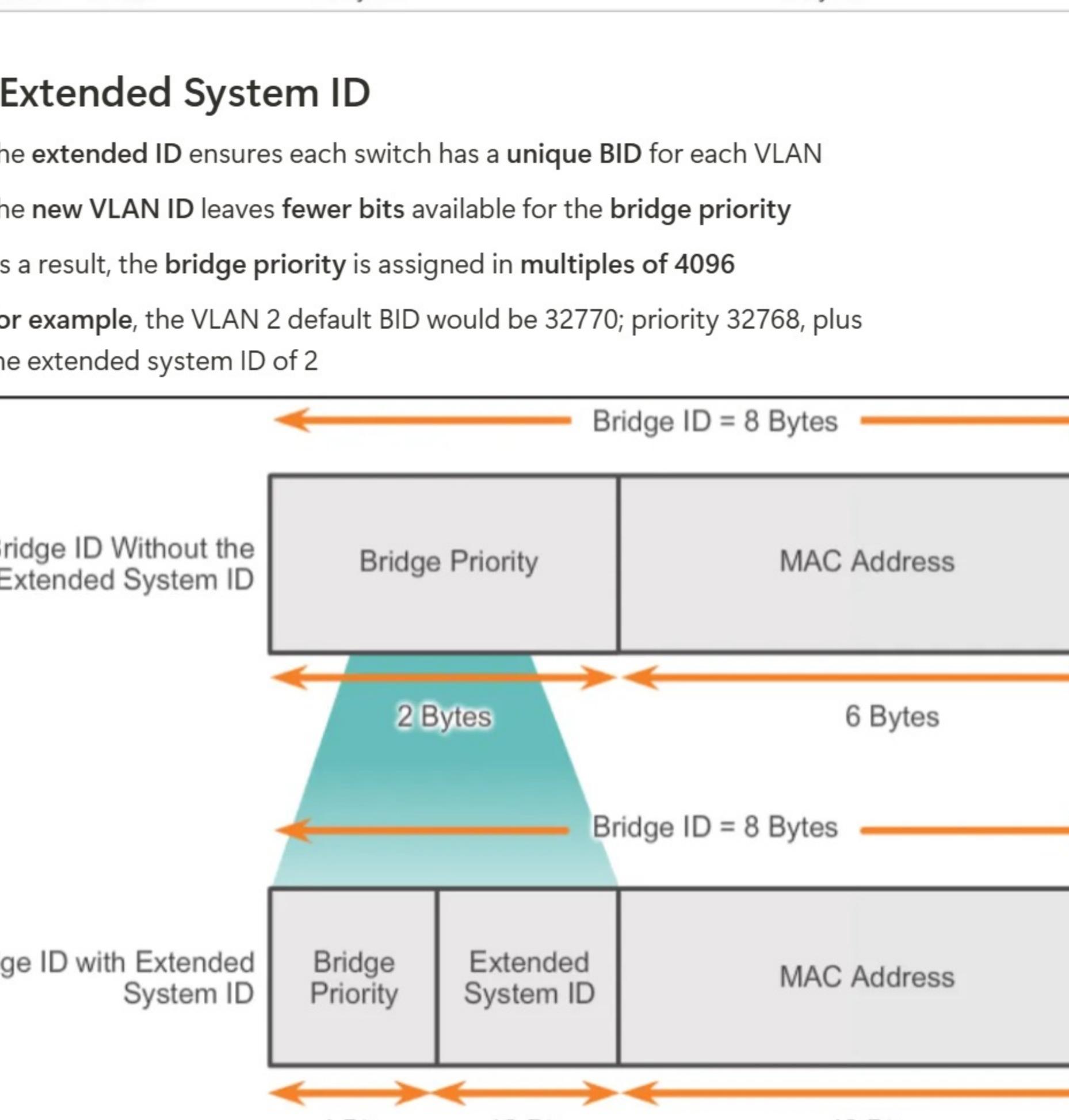
Protocol	Standard	Resources Needed	Convergence	Tree Calculation
STP	802.1D	Low	Slow	All VLANs
PVST+	Cisco	High	Slow	Per VLAN
RSTP	802.1w	Medium	Fast	All VLANs
Rapid PVST+	Cisco	Very high	Fast	Per VLAN
MSTP	802.1s Cisco	Medium or high	Fast	Per Instance

	Slow to converge	Fast to converge
One STP shared by all VLANs	STP	RSTP
Different STP for each VLAN	PVST+	RPVST+

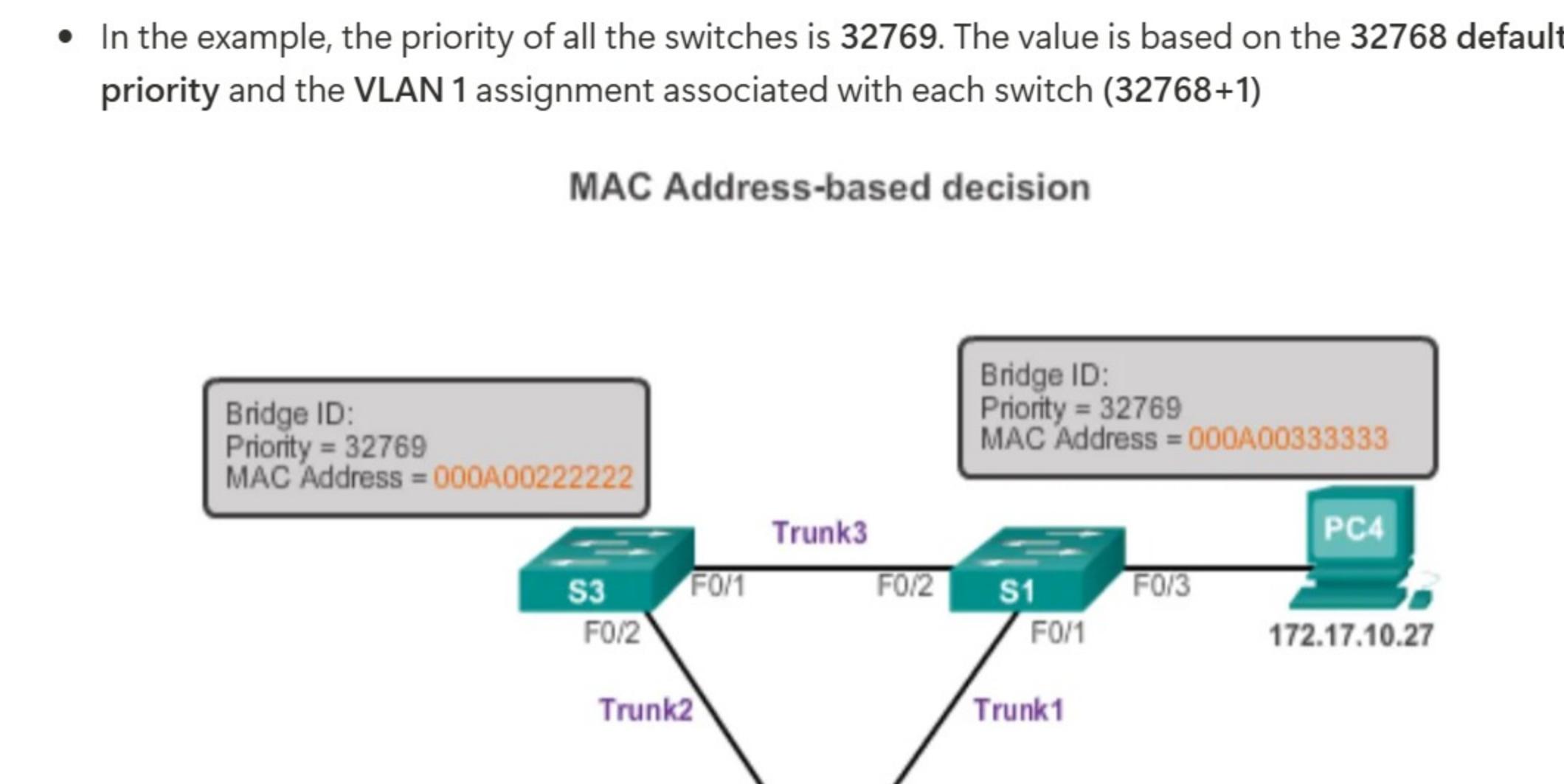
## 2. PVST+

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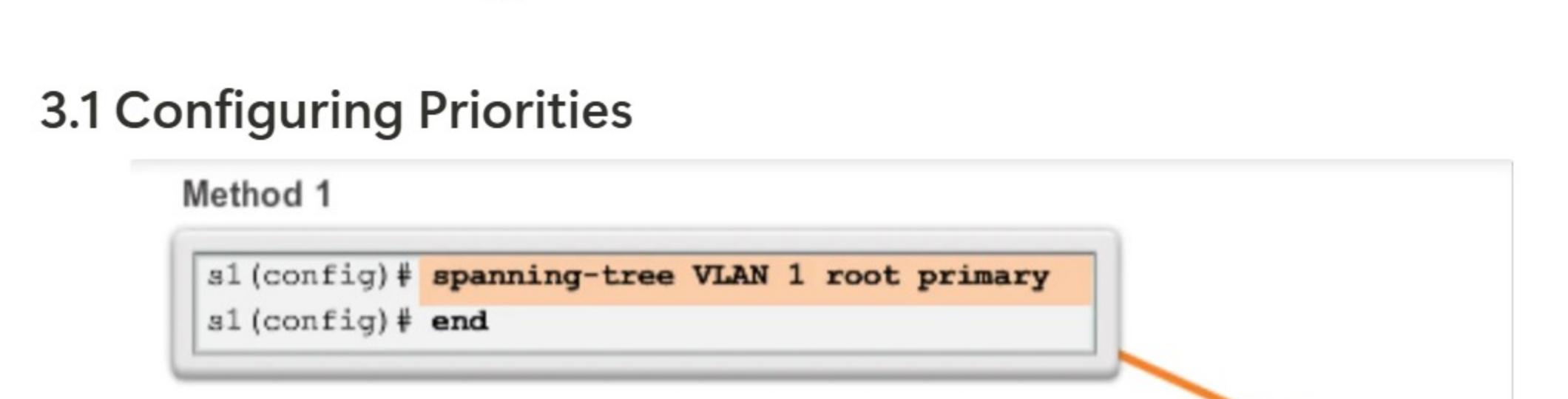


### 2.2 PVST and Bridge IDs



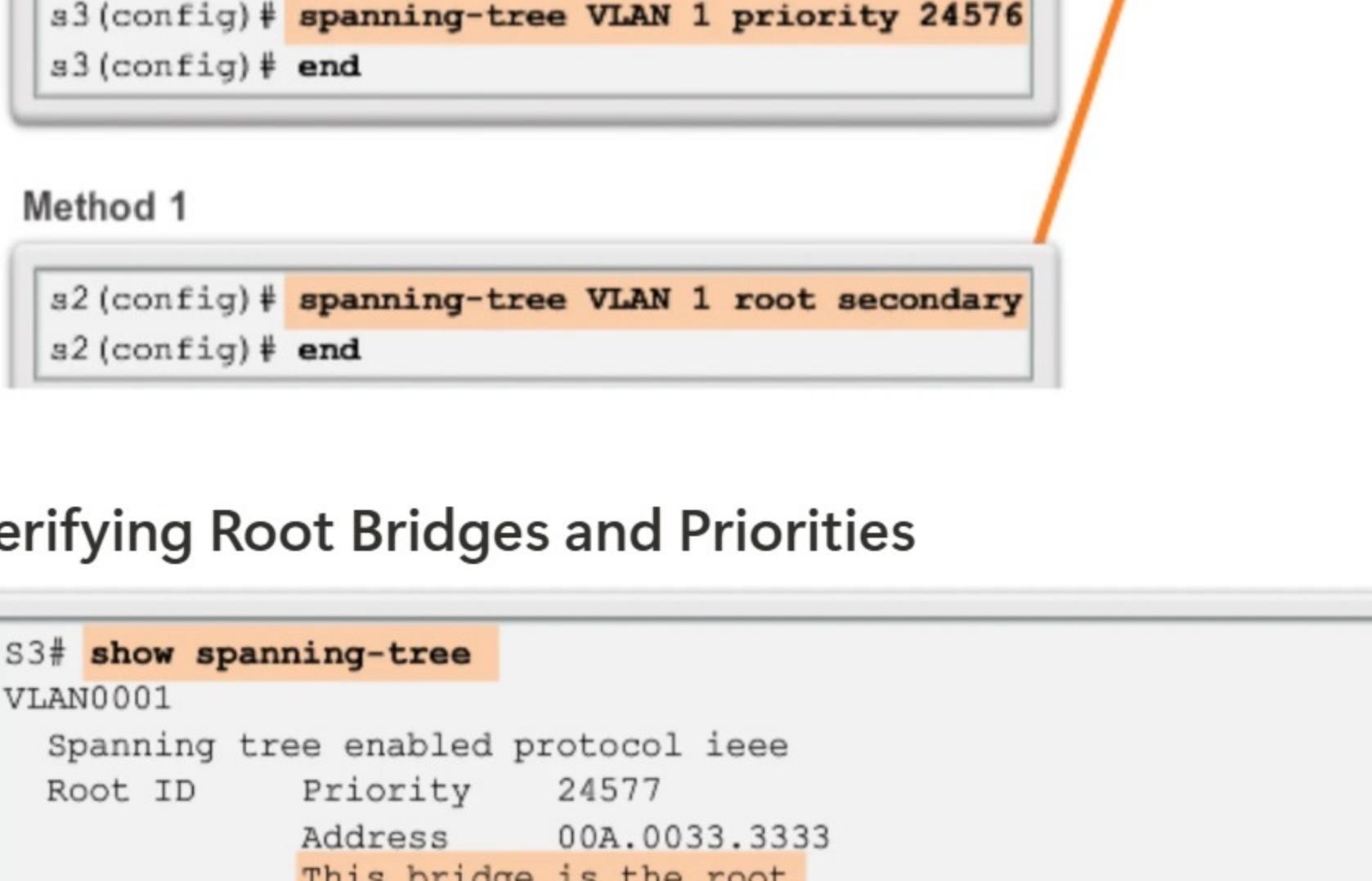
### 2.3 Extended System ID

- The extended ID ensures each switch has a unique BID for each VLAN
- The new VLAN ID leaves fewer bits available for the bridge priority
- As a result, the bridge priority is assigned in multiples of 4096
- For example, the VLAN 2 default BID would be 32770; priority 32768, plus the extended system ID of 2



- In the example, the priority of all the switches is 32769. The value is based on the 32768 default priority and the VLAN 1 assignment associated with each switch (32768+1)

### MAC Address-based decision



## 3. PVST+ Configuration

### 3.1 Configuring Priorities

#### Method 1

```
s1(config)# spanning-tree VLAN 1 root primary
```

```
s1(config)# end
```

#### Method 2

```
s3(config)# spanning-tree VLAN 1 priority 24576
```

```
s3(config)# end
```

#### Method 1

```
s2(config)# spanning-tree VLAN 1 root secondary
```

```
s2(config)# end
```

### 3.2 Verifying Root Bridges and Priorities

```
S3# show spanning-tree
```

```
VLAN0001
Spanning tree enabled protocol ieee
Root ID      Priority 24577
Address      00A.0033.3333
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      00A.0033.3333
Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time   300
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Desg	FWD	4	128.1	p2p
Fa0/2	Desg	FWD	4	128.2	p2p
S3#					