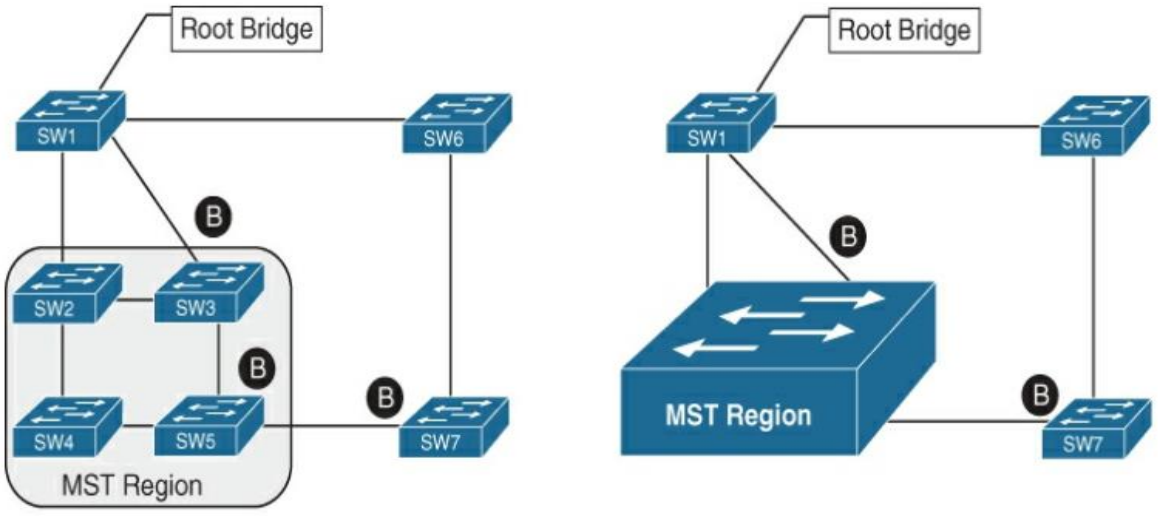
MST (Multiple Spanning Tree):

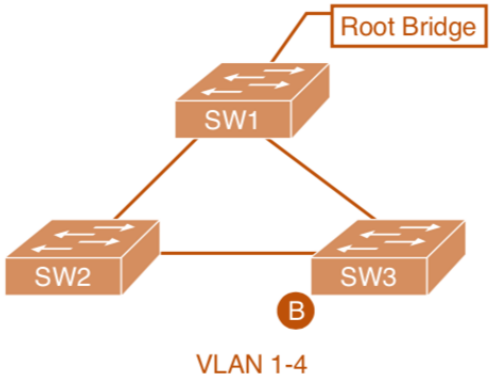
- In Spanning Tree MST is term which is stands for Multiple Spanning Tree.
- IEEE 802.1s standard define multiple Spanning Tree MSTP implementation.
- Common Spanning Tree (CST) has a single instance for all VLANs in switch.
- MST is a concept of mapping one or more VLANs to a single STP instance.
- For Example, such as 1000 VLANs can be mapped to two MST instances.
- Rather than to maintaining and running 1000 separate Spanning Trees.
- Each Cisco Switch needs to maintain only the two Spanning Trees only.
- Reducing need for switch resources also converges faster than PVRST+.
- Multiple Spanning Tree (MST) works with the concept of the regions.
- In MST region is defined by the name given in MST configuration mode.
- Region is group of devices configured together to form a logical region.
- It is similar to administration domain collection of VLANs have same config.
- Collection of VLANs managed under the same MST umbrella is called regions.
- It has same attributes Configuration Name, Revision Number and Instance.
- MST configuration name identify MST region & revision number any number.
- MST revision number is locally significant number signify the MST configuration.
- MST name, instance and revision number must match to build MST topology.

MSTP combines the benefits of RSTP and supports multiple instances of Spanning Tree Protocol. when using MSTP, the Sys-ID-Ext is the same as the instance number. MSTP is fast by nature as it incorporates RSTP as the underlying protocol. The vast majority of switch vendors support the Multiple Spanning Tree Protocol (MSTP). One potential drawback of using MSTP is that it can be more complicated to configure and manage than other spanning tree protocols. Multiple Spanning Tree Protocol (MST) maps one or multiple VLANs to one STP instance. A group of MST switches with the same high-level configuration is known as an MST region.



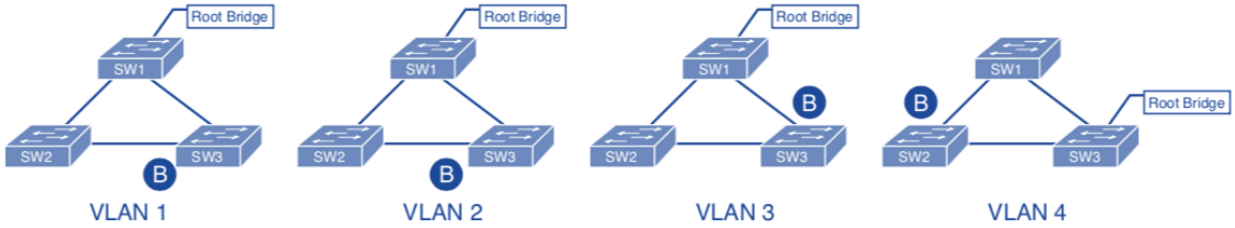
CST Topology:

The Common Spanning Tree (CST) topology. VLANs 1 - 4 share the same topology. Traffic from SW2 to SW3 must pass through SW1. If only SW2 and SW3 had end devices in VLAN 4, the topology could not be tuned to allow traffic to traverse directly between the two switches.



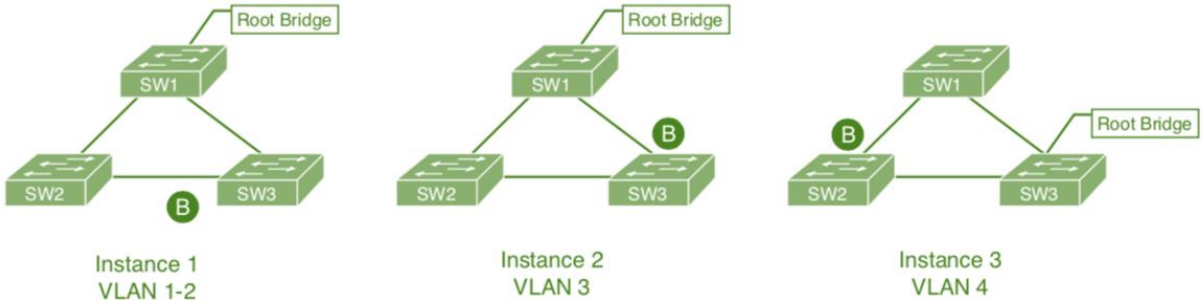
PVST Topologies:

Per-VLAN Spanning Tree (PVST) provides a separate spanning tree instance for each VLAN configured on the network. The topologies below show how the switches maintain a different STP topology for each of the four VLANs. In environments with thousands of VLANs, maintaining an STP state for every VLAN can burden the switch's processor.



MST Topology:

MST maps one or multiple VLANs into one STP tree, called an MST instance (MSTI). The figure shows how the switches maintain STP topologies for four VLANs. If more VLANs were added to the environment, the switches would maintain three STP topologies if the VLANs aligned to one of the existing MSTIs.



MSTP Port Types:

MSTP port types are similar to RSTP but on a per-instance basis.

Root:

Root port connects the Bridge to the MSTI Regional Root at the lowest possible cost.

Designated:

Provides the shortest route from the connected LANs to the Regional Root via the Bridge.

Alternate:

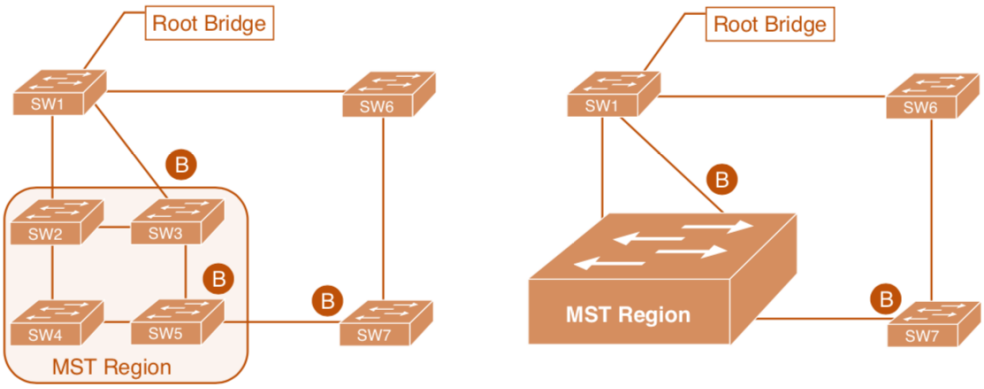
Port provides second path to the root device from the root interface, in case the first path fails.

Backup:

The port serves as a fallback path to the designated port path leading to the Spanning Tree leaves when the primary path is unavailable.

MST Regions:

An MST region is a group of switches with the same configuration attributes and managed by a single entity. An MST configuration attributes consist of a 32 bytes Configuration name.
A 2 bytes Revision number. A Mapping table to map VLANs to instance numbers. For two switches to belong to the same region, all these configuration attributes must be the same. If any one of the above configuration attributes differs or is missing, then this means that two bridges are in different regions.



Actual STP Topology

Topology from non-MST Switches

MSTP BPDUs:

Multiple Spanning Tree BPDUs utilize protocol version 3, and they contain configuration name, revision number, and digest of the VLAN instance mapping table. Every switch generates one configuration BPDU every Hello interval (default = 2 seconds), similar to RSTP. The standard RSTP BPDU format is used to convey all MSTP information.

MST Instances:

MST uses a special instance, instance 0, called the Internal Spanning Tree (IST). It is always the first instance and runs on all switch port interfaces in the MST region regardless of the VLANs associated with the ports. Additional information about other MSTIs is nested in the IST BPDU that is transmitted throughout the MST region. This allows MST to advertise only one set of BPDUs, which minimizes STP traffic. Up to 16 MST instances are supported by default.