STP -> RSTP -> MST

Essentials: what changes from one flavour to the next?

Agenda

- Reminder: Midterm test is Fri Feb 17 @ 10-noon
  - covers all material related to Ch 1-4, some inter-VLAN routing

  ... then you have a week off! :-)
- NetRiders Registration is due by Wed Feb 22
  - http://www.academynetriders.com/index.php
  - still no updates regarding eligibility for students away on co-op
- Quick review & wrap-up of STP: STP best practices, RSTP, MST
- New material: Ch 5: Inter-VLAN routing
  - start with review of DHCP for IPv4
  - cover DHCP for IPv6 (prep for Lab 7)

Assigned Readings and Lab work

- Read FLG Ch 5 p. 203-240; due by this class
- Start studying for midterm: re-read Ch 3 - 4
- Lab 7: STP protections and DHCP for IPv4, IPv6
- Pre-lab & post-lab as per the regular schedule

On MST

MST is needed because Per-VLAN STP/RSTP hits hard limits pretty quickly: "*Cisco switches like those used in these labs allow only a limited number of PVST instances – usually 128. If more than 128 VLANs are created, some of them will not have any STP running, and therefore not have any switching loop protection*." (p. 1 of CCNP Lab 4-2)

On RSTP

Some excellent commentary on RSTP appears on p. 16 of CCNP v7 Lab 4-1:

- A good description of the Proposal-Sync-Agreement operation
- "*Ports configured as edge ports are not affected by the Sync operation and will remain in the Forwarding state even during the Proposal/Agreement handling. Activating RSTP in a network without properly configuring ports toward end hosts as edge ports will cause the network to perform possibly even more poorly than with legacy STP [Not sure why!]. With RSTP, proper configuration of ports toward end hosts as edge ports is an absolute necessity. Cisco switches default to all their ports being non-edge ports.*"

Remember: *Loops are deadly to a network*. [1]

> "RSTP (IEEE 802.1w) natively includes most of the Cisco proprietary enhancements to the 802.1D spanning tree, such as **BackboneFast, UplinkFast**, and **PortFast**. RSTP can achieve much faster convergence in a properly configured network, sometimes in the order of a **few hundred milliseconds**. Classic 802.1D timers, such as forward delay and max_age, are only used as a backup and should not be necessary if point-to-point links and edge ports are properly identified and set by the administrator. Also, the timers should not be necessary if there is no interaction with legacy bridges." [What about **hello**??] [3]
>
> "In most cases, RSTP performs better than proprietary extensions of Cisco without any additional configuration." [3]

Tuning Timers

CST or RSTP:

```
spanning-tree vlan {range} hello-time {1-10}
spanning-tree vlan {range} max-age {6-40}
spanning-tree vlan {range} forward-time {4-30}
```

MSTP:

```
spanning-tree mst hello-time {1-10}
spanning-tree mst max-age {6-40}
spanning-tree mst forward-time {4-30}
```

Be warned! "*However, until recently, redundant switched networks had to rely on the relatively sluggish 802.1d STP to achieve those goals. This often turned out to be the network administrator's most challenging task. The only way to get a few seconds off the protocol was to **tune the** protocol **timers**, but often at the **detriment of the network's health**.*" [4]

References (Note: **STA** = Spanning Tree Algorithm)

1. 802.1D: Understanding & Configuring Spanning Tree Protocol (STP)
   www.cisco.com/en/US/tech/tk389/tk621/technologies_configuration_example09186a008009467c.shtml
2. Understanding and Tuning Spanning Tree Protocol Timers
   www.cisco.com/en/US/tech/tk389/tk621/technologies_tech_note09186a0080094954.shtml
3. 802.1w: **Understanding Rapid Spanning Tree Protocol** [Best Reference]
   www.cisco.com/en/US/tech/tk389/tk621/technologies_white_paper09186a0080094cfa.shtml
4. 802.1s: Understanding Multiple Spanning Tree Protocol
   www.cisco.com/en/US/tech/tk389/tk621/technologies_white_paper09186a0080094cfc.shtml
5. Migrating to RSTP
   http://www.cisco.com/en/US/products/hw/switches/ps708/products_configuration_example09186a00807b0670.shtml
6. Migrating to MSTP
   http://www.cisco.com/en/US/products/hw/switches/ps708/products_configuration_example09186a00807b075f.shtml