## 2.3 Configure and verify Layer 2 discovery protocols (Cisco Discovery Protocol and LLDP)

| CDP | LLDP |
|---|---|
| has a 60-second update frequency | has a 30-second update frequency |
| has a 180-second hold timer | has a 120-second hold timer |
| multicast 0100.0CCC.CCCC | multicast 0180.C200.000E |
| is enabled by default | is disabled by default |
| is a Layer 2 protocol | is a Layer 2 protocol |
| is a proprietary protocol | is an open-standard protocol |
| can convey VTP information | |

### Cisco Discovery Protocol (CDP)

CDP is a Layer 2 Cisco proprietary neighbor discovery protocol. Cisco IP phone appears to CDP as a unique neighbor device with an IP address. During bootup, the IP phone receives voice VLAN configuration from the access switch port.

- Cisco-proprietary, enabled on Cisco devices by default.
- CDP messages are periodically sent to multicast MAC address **0100.0CCC.CCCC**.
- By default, CDP messages are sent once every **60 seconds**, and the holdtime of CDP neighbor table is **180 seconds**.
- Related commands:
    * Enable/disable CDP globally: **(config)#(no) cdp run**
    * Enable/disable CDP on an interface: **(config-if)#(no) cdp enable**
    * Set CDP send timer: **(config)#cdp timer [time-in-second]**
    * Set CDP hold time: **(config)#cdp holdtime [time-in-second]**
    * Show cdp configuration (timers, version): **#show cdp**
    * Show how many CDP messages have been sent/received: **#show cdp traffic**
    * Display which interfaces CDP is enabled on: **#show cdp interface**
    * List basic info (without IP addresses) on all neighbors, or neighbors on a given interface: **#show cdp neighbors ([interface-name])**
    * Show detailed information on all neighbors: **show cdp neighbors detail**
    * Display info of one specific neighbor: **#show cdp entry ([name-of-neighbor])**

CDP can assist in network discovery and troubleshooting. CDP advertises the following helpful information:

- **Device identifier:** Typically the host name
- **Address list:** Network and data-link addresses
- **Port identifier:** The interface on the remote router or switch on the other end of the link that sent the CDP advertisement
- **Capabilities list:** Information on what type of device it is (for example, a router or a switch)
- **Platform:** The model and OS level running on the device

**Table 9-3 show cdp Commands That List Information About Neighbors**

| Command | Description |
|---|---|
| show cdp neighbors [*type number*] | Lists one summary line of information about each neighbor or just the neighbor found on a specific interface if an interface was listed |
| show cdp neighbors detail | Lists one large set (approximately 15 lines) of information, one set for every neighbor |
| show cdp entry *name* | Lists the same information as the **show cdp neighbors detail** command, but only for the named neighbor (case sensitive) |

With IP Phones, CDP messages containing *device voice VLAN ID* info, is sent **from the Switch** to the IP Phone. Not the other way around. The IP phone doesn't send the VLAN ID to the switch.

## LLDP

- Industry standard (IEEE 802.1AB).
- Has same syntax to CDP, but with **lldp replacing cdp** with some differences:
  - Enable transmission on an interface: **(config-if)#lldp transmit**
  - Enable receipt on an interface: **(config-if)#lldp receive**
  - With LLDP, **Tx** (transmission) /**Rx** (reception) can be controlled independently on each interface with the cmds above **lldp [transmit / receive]**
- By default, LLDP timer is **30 seconds** and the holdtime is **120 seconds**.
- LLDP messages are sent to MAC address **0180.C200.000E**

Note that when reading LLDP/CDP output, "Local interface" means the interface on the host, while "Port ID" means the interface on the neighbor device.

Use the **no lldp run** command to disable LLDP globally, just like **no cdp run**

To disable lldp or cdp on an interface use **no [lldp/cdp] enable**

To restore LLDP hold timer back to default use **no lldp holdtime**

LLDP shows the following about neighbors:

- Management address
  - the IP address used to access the device for management (configuring and verifying the device)
- System capabilities
  - different hardware and software specifications of the device, OS
- System name
  - the host name that was configured on that device
- LLDP can be used to learn the OS version of a neighboring device.

However, the LLDP output in the example does differ from CDP in a few important ways:

- LLDP uses **B** as the capability code for switching, referring to **bridge**, a term for the device type that existed before switches that performed the same basic functions.
- LLDP does not identify IGMP as a capability, while CDP does (**I**).
- CDP lists the neighbor's **platform**, a code that defines the device type, while LLDP does not.
- LLDP lists capabilities with different conventions (see upcoming Example 9-19).