

THE TWO PROTOCOLS SIDE BY SIDE

	CDP	LLDP
Full name	Cisco Discovery Protocol	Link Layer Discovery Protocol
Standard	Cisco proprietary	IEEE 802.1AB
Layer	Layer 2 — runs on the link, needs no IP address at either end	
Default state	Enabled	Disabled
Advertisement	every 60 s	every 30 s
Hold time	180 s (3×)	120 s (4×)
Re-init delay	n/a	2 s (2–5)
Destination MAC	0100.0CCC.CCCC	0180.C200.000E
Encapsulation	802.2 LLC + SNAP OUI 00000C / type 0x2000	Ethernet II EtherType 0x88CC
Enable globally	cdp run	lldp run
Enable per interface	cdp enable	lldp transmit lldp receive
Send and receive	one switch, not separable	separable — listen only is possible
Endpoint extension	CDP power / voice VLAN TLVs	LLDP-MED (TIA-1057)

Both are **neighbour** protocols. They tell you what is on the far end of a cable you are already plugged into — never what is two hops away.

ON THE WIRE

CDP frame

802.3 MAC header 14 LLC 3 SNAP 5 CDP header 4 TLV ... TLV
Destination 0100.0CCC.CCCC, SNAP OUI 00-00-0C, protocol ID 0x2000. CDP header carries version, TTL and a checksum, then a run of type/length/value records.

LLDP frame

Ethernet II 14 Chassis ID Port ID TTL optional TLVs End
Destination 0180.C200.000E, EtherType 0x88CC. The first three TLVs are mandatory and must appear **in that order**; the End-of-LLDPDU TLV closes the unit.

Neither protocol is forwarded. A conformant bridge consumes the frame rather than flooding it, so a neighbour entry always means a *directly attached* device — with one caveat below.

Watch for: an unmanaged hub, a media converter or a transparent tap between two switches does not consume the frame. The two switches then see each other as neighbours, and the diagram you draw from the output quietly omits the device in the middle.

CDP CONFIGURATION

Switch(config)#cdp run

Global on/off. On by default — no cdp run kills it device wide

Switch(config)#cdp timer 60

Seconds between advertisements. Default 60

Switch(config)#cdp holdtime 180

Seconds a neighbour is kept after the last frame. Default 180, and it must stay larger than the timer

Switch(config)#cdp advertise-v2

Send CDPv2 TLVs — VTP domain, native VLAN, duplex. On by default

Switch(config)#interface GigabitEthernet1/0/24

Switch(config-if)#no cdp enable

Per interface. The usual use is one port facing a customer or a partner

The pattern worth adopting — leave CDP running globally, then switch it off on the handful of interfaces that face something you do not control. Turning it off globally to be safe takes your phones' power negotiation and voice VLAN with it.

WHAT CDP CARRIES

TLV	What it tells you
Device ID	hostname, or the serial number on a phone
Address	every protocol address configured on the sender
Port ID	the interface the frame left by
Capabilities	router, switch, host, phone ... see codes below
Version	the full IOS version banner
Platform	hardware model
Management address	the address to manage the device on
VTP domain	v2 only
Native VLAN	v2 only — finds native VLAN mismatches
Duplex	v2 only — finds duplex mismatches
Power request / available	PoE negotiation with a Cisco phone or AP
Trust bitmap, untrusted CoS	QoS trust boundary pushed out to the phone
MTU, IP prefix, sysName, sysObjectID	ODR and management extras

Capability codes in show cdp neighbors

R Router · T Trans Bridge · B Source Route Bridge · S Switch · H Host · I IGMP · r Repeater · P Phone · D Remote · C CVTA · M Two-port Mac Relay

Version 2 matters. The native VLAN and duplex TLVs are what turn CDP from a map into a diagnostic. They arrive only with **cdp advertise-v2**, which is on by default — if someone has turned it off you lose both warnings silently.

CDP VERIFICATION

Switch#show cdp neighbors

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater,
P - Phone, D - Remote, C - CVTA, M - Two-port Mac Relay

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
R1	Gig 1/0/1	154	R S I	C1111-8P	Gig 0/0
SEP0011.2233.44	Gig 1/0/5	162	H P M	IP Phone	Port 1

- Holdtime counting down** from 180. If it never resets, frames have stopped arriving and the entry will disappear within three minutes.
- Local Intrfce** is *your* port; **Port ID** is *theirs*. Reading these the wrong way round is the single most common mistake made with this output.

Switch#show cdp neighbors detail

```

Device ID: R1
Entry address(es):
  IP address: 10.1.1.1
Platform: cisco C1111-8P, Capabilities: Router Switch IGMP
Interface: GigabitEthernet1/0/1,
  Port ID (outgoing port): GigabitEthernet0/0/0
Holdtime : 154 sec
Version :
Cisco IOS XE Software, Version 17.06.04
advertisement version: 2
VTP Management Domain: 'CAMPUS'
Native VLAN: 1
Duplex: full

```

Command	Use it for
show cdp	global state, timer and holdtime in one line
show cdp interface	which interfaces are running CDP
show cdp entry NAME	one neighbour in detail, by name
show cdp entry * protocol	every neighbour address, nothing else
show cdp traffic	packets sent and received, and checksum errors
clear cdp table	drop the table and rebuild it — proves what is live

THE LLDP TLV

Everything LLDP says is a **type / length / value** record. The header is two octets, split unevenly:

TLV Type	7 bits	TLV Length	9 bits	TLV Information String
				0–511 octets

- 7 bits of type gives **128** possible TLVs, 0 through 127
- 9 bits of length caps one value at **511** octets
- Type **127** is the escape hatch: *organizationally specific*. Its value starts with a 3-octet OUI and a 1-octet subtype, which is how IEEE 802.1, IEEE 802.3 and TIA all bolt their own TLVs on without ever needing a new type number

The LLDPDU

Type	TLV	Status
1	Chassis ID	mandatory, first
2	Port ID	mandatory, second
3	Time To Live	mandatory, third
4	Port Description	optional
5	System Name	optional
6	System Description	optional
7	System Capabilities	optional
8	Management Address	optional
9–126	reserved	—
127	Organizationally Specific	optional, repeatable
0	End of LLDPDU	mandatory, last

The three group addresses

Destination	Propagates as far as
0180.C200.000E	nearest bridge — stops at the first bridge (what Cisco sends)
0180.C200.0003	nearest non-TPMR bridge
0180.C200.0000	nearest customer bridge — crosses provider bridges

TTL of zero. A device shutting an interface down sends one last LLDPDU with TTL 0 — a shutdown notification. The neighbour drops the entry immediately instead of waiting out the 120 seconds. CDP has no equivalent.

IDENTIFYING A NEIGHBOUR

Chassis ID and Port ID each carry a subtype saying *what kind* of identifier follows — which is why one neighbour appears as a MAC address and another as a name.

#	Chassis ID subtype	Port ID subtype
1	Chassis component	Interface alias
2	Interface alias	Port component
3	Port component	MAC address
4	MAC address	Network address
5	Network address	Interface name
6	Interface name	Agent circuit ID
7	Locally assigned	Locally assigned

System capability bits

Two fields are sent: what the device *can* do, and what is *enabled*. Cisco prints them as letters: **R** Router · **B** Bridge · **T** Telephone · **C** DOCSIS Cable Device · **W** WLAN Access Point · **P** Repeater · **S** Station · **O** Other

Organizationally specific TLVs (all type 127)

OUI	Subtypes
IEEE 802.1 00-80-C2	1 Port VLAN ID · 2 Port & Protocol VLAN ID · 3 VLAN Name · 4 Protocol Identity · 6 Management VID · 7 Link Aggregation
IEEE 802.3 00-12-0F	1 MAC/PHY Config & Status · 2 Power via MDI · 3 Link Aggregation · 4 Maximum Frame Size
TIA / LLDP-MED 00-12-BB	11 subtypes — see overleaf

The 802.1 Port VLAN ID and the 802.3 MAC/PHY TLVs are LLDP's answer to CDPv2's native VLAN and duplex TLVs. Same diagnostic, different packaging.

LLDP CONFIGURATION

```
Switch(config)#lldp run
Global on. Off by default — nothing happens until this is set
Switch(config)#lldp timer 30
Seconds between advertisements. Default 30, range 5–65534
Switch(config)#lldp holdtime 120
Seconds a neighbour holds the entry. Default 120, range 0–65535
Switch(config)#lldp reinit 2
Seconds to wait before re-initialising LLDP on an interface. Default 2, range 2–5
Switch(config)#interface range Gi1/0/1 - 24
Switch(config-if-range)#lldp transmit
Switch(config-if-range)#lldp receive
Separate switches. Dropping transmit on an edge port gives you a listen-only interface: you still see what plugged in, and tell it nothing
Switch(config-if)#no lldp tlv-select system-description
Suppress one optional TLV without turning the protocol off
```

The asymmetry to remember. CDP is one switch per interface. LLDP is two. A port with **lldp receive** and no **lldp transmit** shows up in *your* neighbour table and in nobody else's — useful at the edge, and confusing if you forget you did it.

LLDP VERIFICATION

```
Switch#show lldp neighbors
Capability codes:
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Device ID      Local Intf  Hold-time  Capability  Port ID
R1             Gi1/0/1    120        R, B        Gi0/0/0
SEP001122334455 Gi1/0/5    180        B, T        001122334455:P1
```

- Hold-time is what the neighbour told you**, not your own setting. The phone above advertises 180 while the switch advertises 120 — both are correct.
- A phone reports B,T** — bridge and telephone. It bridges because the PC hangs off its back port. That is your clue that two devices sit behind one switch port.

Command	Use it for
show lldp	global state, timer, holdtime, reinit
show lldp interface	tx and rx state per interface
show lldp entry *	every neighbour in full detail
show lldp neighbors detail	the TLVs one neighbour actually sent
show lldp traffic	frames in and out, discards, unrecognised TLVs
clear lldp table	drop and rebuild the neighbour table

Unrecognised TLVs are not an error. **show lldp traffic** counts them, and a healthy switch talking to a third-party phone counts plenty. It means the far end sent something this platform does not parse — not that anything is broken.

WHEN BOTH ARE RUNNING

Running CDP and LLDP together on the same port is normal, not a conflict. They are separate protocols with separate tables, and each costs one small frame per interval.

Situation	What to run
All-Cisco infrastructure	CDP is enough, and carries more
Mixed-vendor infrastructure	LLDP — the only one both ends speak
Cisco phones	CDP, which they use by default
Third-party phones	LLDP-MED
Wired location / E911	LLDP-MED — CDP has no location TLV
NMS auto-discovery	whichever your NMS reads — many read both

The one that catches people. A Cisco phone offered a voice VLAN by CDP and a network policy by LLDP-MED takes the CDP answer, because that is what it asks for first. Change the LLDP policy alone and nothing appears to happen — the phone was never listening to it. Check with **show cdp neighbors detail** before assuming the MED configuration is wrong.

On a port with no phone and no third-party gear, leaving both enabled costs you nothing but tells anything plugged in more than it needs to know. See below.

LLDP-MED

Media Endpoint Discovery, ANSI/TIA-1057. An extension carried inside LLDP type 127 under the TIA OUI 00-12-BB. It exists to solve the problem CDP solved for Cisco phones, for phones that are not Cisco: *tell the endpoint which VLAN to use, how to mark its traffic, and how much power it may draw — before it has an IP address.*

Device classes

Class	What it is
Network Connectivity	the switch, router or AP. Hands out policy; does not consume it
Endpoint Class I	generic — call controllers and the like. Capabilities and inventory only
Endpoint Class II	media — gateways, conference bridges. Adds network policy
Endpoint Class III	communication — IP phones and softphones. Adds location, which is what makes E911 work

The eleven MED subtypes

#	Subtype	Carries
1	LLDP-MED Capabilities	class, and which MED TLVs follow
2	Network Policy	VLAN, tagging, CoS, DSCP
3	Location Identification	civic, coordinate or ELIN
4	Extended Power-via-MDI	power type, source, priority, value
5–11	Inventory	hardware, firmware, software, serial, manufacturer, model, asset ID

Network policy application types

1 Voice · 2 Voice Signaling · 3 Guest Voice · 4 Guest Voice Signaling · 5 Softphone Voice · 6 Video Conferencing · 7 Streaming Video · 8 Video Signaling

Fast start. Waiting 30 seconds for a policy would make a phone look broken at boot. When a MED endpoint is detected the switch sends a burst of LLDPDUs one second apart — three by default in TIA-1057 — so the phone has its VLAN almost immediately. The repeat count is not exposed in the Catalyst LLDP command set.

READING A PHONE OFF THE PORT

```
Switch#show lldp neighbors Gi1/0/5 detail
Local Intf: Gi1/0/5
Chassis id: 10.10.100.42
Port id: 001122334455:P1
System Name: SEP001122334455
System Description: Cisco IP Phone 8845
Time remaining: 172 seconds
System Capabilities: B,T
Enabled Capabilities: B,T
Auto Negotiation - supported, enabled
```

```
MED Information:
Capabilities: NP, LI, PD, IN
Device type: Endpoint Class III
Network Policy(Voice): VLAN 100, tagged,
Layer-2 priority: 5, DSCP: 46
Location - not advertised
Power requirements: 6500 mW
Power Type: PD Device
Power Source: PSE
Power Priority: High
Serial number: FCH2233ABCD
Model: CP-8845
```

- Class III** confirms it is a communication endpoint, so location and E911 are available on this port.
- Network Policy read back from the phone** is the useful line: it proves the phone received the policy, rather than that you configured one.
- 6500 mW** is the negotiated draw, in tenths of a watt on the wire. **show power inline** is the other half of that conversation.

Sample output, edited for width.

LLDP-MED CONFIGURATION

Voice VLAN and QoS by network policy

```
Switch(config)#network-policy profile 1
Switch(config-network-policy)#voice vlan 100 cos 5
Switch(config-network-policy)#voice-signaling vlan 100 cos 3
VLAN 1–4094; CoS 0–7 (5 default), DSCP 0–63 (46 default). untagged, dot1p and none are also valid in place of a VLAN ID
Switch(config)#interface GigabitEthernet1/0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#network-policy 1
Switch(config-if)#lldp med-tlv-select network-policy
MED TLVs are all on by default; this is how you re-enable one you turned off. The four selectable TLVs are network-policy, location, power-management and inventory-management
```

Order matters, and Cisco documents it. Configure **switchport voice vlan** first and you may then add a network-policy profile. Configure the profile first and the **switchport voice vlan** command is refused on that interface.

Location, for E911

```
Switch(config)#location civic-location identifier 1
Switch(config-civic)#building "HQ" / city / state / room 214
Switch(config)#location elin-location 14045550111 identifier 1
The ELIN is the number the PSAP call-back reaches
Switch(config-if)#location civic-location-id 1
Switch(config-if)#location elin-location-id 1
Switch(config-if)#lldp med-tlv-select location
```

Location is per **interface**, which is the point: the wall port is the only thing in the chain that cannot move. **show location civic-location identifier 1** reads it back.

LOCKING THEM DOWN

What you are advertising

Between them these protocols announce your hostname, model, exact software version, management address, native VLAN and duplex — to anything plugged into the port. That is a reconnaissance gift on any link you do not control.

Where	Do
Internet / DMZ edge	no cdp enable no lldp transmit
Partner or customer handoff	same, both protocols
User access ports	keep MED for phones; consider receive-only if there are no phones
Infrastructure trunks	leave both on — this is where they earn their keep

When a neighbour will not appear

- Is the protocol on **globally**? LLDP is off until **lldp run**.
- Is it on **this interface**, in the **right direction**? **show lldp interface**.
- Is the interface **up/up**? Neither protocol runs on a down link.
- Has the far end **disabled it**, or is it a device that speaks only the other one?
- Is something **transparent** in the middle absorbing or passing the frame — a hub, a converter, a tap?
- show cdp traffic/show lldp traffic** — frames going out but none coming back narrows it to the far end fast.