

3. QoS (Quality of Service) – in Simple and Detailed Way

QoS is a method used in networks to **control, prioritize, and manage traffic**.

Why QoS is needed?

Because:

- Voice packets need to reach quickly.
- Delay or loss causes bad audio quality.

QoS ensures:

- Voice packets get **priority**
- Less important traffic (downloads, web browsing) gets lower priority
- Network congestion does not affect phone calls

QoS handles:

- 1. Bandwidth allocation**
- 2. Prioritization**
- 3. Traffic shaping** (slowing or controlling traffic)
- 4. Queuing** (deciding packet order)

QoS in simple terms:

“QoS makes sure voice traffic gets the fast lane, and other traffic uses normal lanes.”

4. CoS (Class of Service)

CoS is a **Layer 2 (Ethernet) traffic marking** method, used mainly in VLAN-tagged networks (IEEE 802.1Q).

Where is CoS used?

- Inside Ethernet frames (Layer 2)
- Works on **switches**

How CoS works:

CoS uses a **3-bit value (0–7)** called **Priority Code Point (PCP)**.

Common CoS values:

- **CoS 5 → Voice traffic (high priority)**
- **CoS 0 → Best-effort traffic (normal data)**
- **CoS 3 → Video**
- **CoS 1 → Background traffic**

CoS simple explanation:

“CoS marks Ethernet frames to show their priority so switches can handle important traffic first.”



PCP/CoS

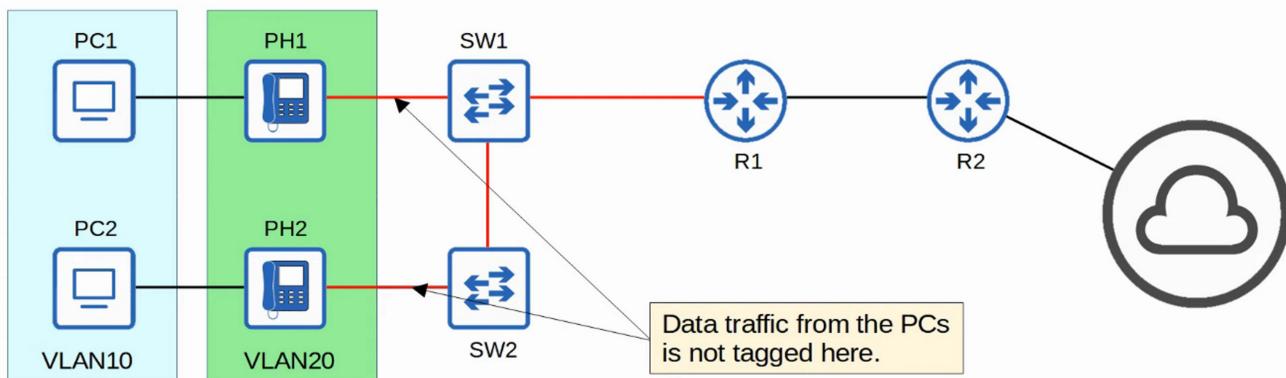
Ethernet Header



802.1Q tag format



PCP value	Traffic types
0	Best effort (default)
1	Background
2	Excellent effort
3	Critical applications
4	Video
5	Voice
6	Internet control
7	Network control



5. DSCP (Differentiated Services Code Point)

Offsets		Octet		0								1								2								3															
Octet	Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31										
0	0	Version		IHL		DSCP								ECN								Total Length																					
4	32	Identification																Flags		Fragment Offset																							
8	64	Time To Live								Protocol								Header Checksum																									
12	96	Source IP Address																Destination IP Address																									
16	128	Options (if IHL > 5)																																									
20	160																																										
24	192																																										
28	224																																										
32	256																																										

DSCP is a **Layer 3 (IP level)** traffic marking method.

Where is DSCP used?

- Routers
- IP packets
- QoS policies over WAN/Internet

DSCP uses a 6-bit field (values from 0–63).

Common DSCP values:

Type of Traffic DSCP Value Meaning

Voice	EF 46	Expedited Forwarding (highest priority)
Video	34 (AF41)	High priority multimedia
Normal Data	0	Best effort
Background	8 (CS1)	Low priority

Why DSCP is important?

- Routers use DSCP to ensure voice gets priority across networks and the internet.
- Provide consistent QoS end-to-end.

DSCP simple explanation:

“DSCP is a priority label added to IP packets so routers know which packets (like voice) need faster delivery.”

★ Putting It All Together (Very Simple Summary)

Feature	Layer	Purpose	Example Value
CoS	Layer 2 (Switch)	Prioritize Ethernet frames	CoS 5 (Voice)
DSCP	Layer 3 (Router)	Prioritize IP packets	DSCP 46 (EF)
QoS	Network-wide	Ensures smooth service	High priority for VoIP
Voice VLAN	L2 VLAN	Separate voice from data	VLAN 20 for voice