Layer 1 Troubleshooting

- Basic switch troubleshooting involves checking for Layer 1 and Layer 2 issues
- Copper and Fibre cables are liable to break if not handled correctly

Layer 1 Troubleshooting

- Common Layer 1 problems include:
  - The interface is administratively shut down
  - The cable is disconnected on either or both ends
  - The device on the other end of the cable is powered off
  - Broken connectors which cause loose connections
  - Bent or stretched cables which lead to broken wires or fibres
  - Electro-Magnetic Interference (EMI) sources such as motors or microwaves which cause errors in transmission (newer cable is less susceptible to this)

Layer 1 Troubleshooting Commands

```
Switch# show ip interface brief
```

- 'administratively down' – Issue 'no shutdown'
- 'down/down' – This indicates a Layer 1 issue. Check the interface is cabled at both ends and the device on the other side is powered on
- 'up/down' – This indicates a Layer 2 issue or speed mismatch. Check the interface configuration matches on both sides of the link

Show ip interface brief

```
SW1# show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  up                    up
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  down                  down
FastEthernet0/3        unassigned      YES unset  up                    down
```

Show Interface

```
Switch# show interface
```

- If the interface is reporting an excessive amount of errors it could be either a Layer 1 or Layer 2 problem
- Check the integrity of the cable
- Check the configuration matches on both sides of the link

Show Interface

```
SW1#show interface fastEthernet 0/2
FastEthernet0/2 is up, line protocol is up (connected)
  Hardware is Fast Ethernet, address is 0014.6a8c.2884 (bia 0014.6a8c.2884)
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 10/100BaseTX
  input flow-control is off, output flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:15, output 00:00:00, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     367 packets input, 41739 bytes, 0 no buffer
     Received 60 broadcasts (58 multicasts)
     0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 watchdog, 58 multicast, 0 pause input
     0 input packets with dribble condition detected
     1894 packets output, 150623 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier, 0 PAUSE output
     0 output buffer failures, 0 output buffers swapped out
```

Speed and Duplex Mismatches

- A possible error is speed and/or duplex mismatches
- Incorrect speed settings can cause the interface to operate below its maximum speed
- Speed mismatches will typically bring the interface down
- The interface will typically stay up with duplex mismatches but performance will be terrible because of collisions
- The `show interface` command will report an excessively high number of errors in this case

Speed and Duplex Mismatches

- Both sides of a link must be set the same, as either auto or manually configured
- Cisco devices default to auto
- If one side is set to auto, and the other is manually configured, this will often result in a mismatch
- Best practice is to manually configure ports attached to other network infrastructure devices or servers
- Remember to manually configure both sides of the link!
- If a device has issues with auto negotiating speed or duplex, manually configuring both sides will normally solve the problem

Speed and Duplex Mismatches - CDP

- CDP should detect a duplex mismatch

```
%CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on
FastEthernet0/0 (not half duplex)
```