19. DTP / VTP (Not in Syllabus)
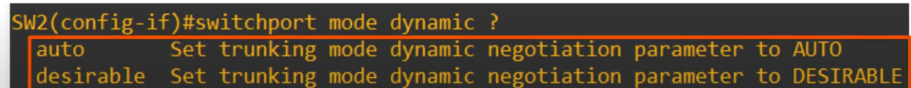
DTP (Dynamic Trunking Protocol)

- Protocol that allows SWITCHES to negotiate the status of their SWITCH-PORTS, without manual configuration, to be:
    - ACCESS PORTS
    - TRUNK PORTS
- DTP is ENABLED by default on all Cisco SWITCH interfaces

We've been manually configuring SWITCHPORTS using :

- "switchport mode access"
- "switchport mode trunk"

`'show interfaces <interface-id> switchport'` will show you a switchport's settings.

For security purposes, **manual configuration** is recommended. DTP should be disabled on ALL SWITCHPORTS

```
SW2(config-if)#switchport mode dynamic ?
  auto       Set trunking mode dynamic negotiation parameter to AUTO
  desirable  Set trunking mode dynamic negotiation parameter to DESIRABLE
```

Figure 1: image

DYNAMIC DESIRABLE:

- This MODE will actively try to form a TRUNK with other Cisco SWITCHES.
- Will form a TRUNK if connected to another SWITCHPORT in the following modes:
    - "switchport mode trunk"
    - "switchport mode dynamic desirable"
    - "switchport mode dynamic auto"

HOWEVER ... if the other interface is set to "static access" (ACCESS mode), it will NOT form a TRUNK, it will be an ACCESS PORT

DYNAMIC AUTO:

- This MODE will NOT actively try to form a TRUNK with other Cisco SWITCHES
- Will form a TRUNK if connected SWTICH is actively trying to form a TRUNK.
- It will form a TRUNK with a SWITCHPORT in the following modes:
    - "switchport mode trunk"
    - "switchport mode dynamic desirable"

TRUNK to ACCESS connection will operate in a **Mismatched Mode**.

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This configuration does NOT work and SHOULD result in an error. Traffic will NOT work.

TABLE SHOWING THE DIFFERENT MODES AND COMPATIBILITY IN FORMING A TRUNK

Administrative Mode	Trunk	Dynamic Desirable	Access	Dynamic Auto
Trunk	Trunk	Trunk	X	Trunk
Dynamic Desirable	Trunk	Trunk	Access	Trunk
Access	X	Access	Access	Access
Dynamic Auto	Trunk	Trunk	Access	Access

Figure 2: image

DTP will NOT form a TRUNK with:

a ROUTER

a PC

etcetera ...

The SWITCHPORT will be in ACCESS Mode only!

OLD SWITCHES:

- "switchport mode dynamic desirable" = Default administrative mode.

NEWER SWITCHES:

- "switchport mode dynamic auto" = Default administrative mode.

HOW TO DISABLE DTP NEGOTIATION ON AN INTERFACE:

- "switchport nonegotiate"
- "switchport mode access"

It is a security recommendation to disable DTP on all SWITCHPORTS and manually configure them as ACCESS or TRUNK ports.

ENCAPSULATION:

SWITCHES that support both:

- 802.1Q
- ISL

TRUNK encapsulation can use DTP to negotiate the encapsulation they will use.

- Negotiation is Enabled by default

```
'switchport trunk encapsulation negotiate'
```

- ISL is favored over 802.1Q
  - If BOTH SWITCHES support ISL, ISL will be selected.
- DTP frames are sent in:
  - VLAN1 when using ISL
  - Native VLAN when using 802.1Q (the default native VLAN is VLAN1, however)

VTP (VLAN Trunking Protocol)

In Privileged EXEC mode:

```
#show vtp status
```

- Protocol for configuring VLANs on a Central SWITCH

  - A SERVER that other SWITCHES synch. to (auto configuring by connection)

- Other switches (VTP CLIENTS) will synchronize their VLAN database to the SERVER

- Designed for large networks with many VLANs (reduces manual configuration)

- RARELY used. Recommended you DO NOT USE it

- There are THREE VTP Versions :

  - v1
    * Does NOT supports Extended VLAN Range 1006-4094
  - v2
    * Does NOT supports Extended VLAN Range 1006-4094
    * Supports Token Ring VLANs ; otherwise similar to V1
  - v3
    * Supports Extended VLAN Range 1006-4094
    * CLIENTS store VLAN dBase in NVRAM

- There are **THREE VTP modes**:
  - SERVER
  - CLIENT
  - TRANSPARENT

- Cisco SWITCHES operate in VTP SERVER mode, by default

Server	Client	Transparent
creates/modifies/deletes VLANs	synchronizes VTP information	creates/modifies/deletes VLANs
synchronizes VTP information	originates VTP advertisements	forwards VTP advertisements
originates VTP advertisements	forwards VTP advertisements	stores VLAN information in NVRAM
forwards VTP advertisements		
stores VLAN information in NVRAM		

Figure 3: image

VTP SERVERS:

- Can ADD / MODIFY / DELETE VLANs
- Store the VLAN dBase in NVRAM
- Increase Revision Number every time VLAN is Added / Modified / Deleted
- Advertises **Latest Version** of VLAN dBase on TRUNK interfaces.
- VTP CLIENTS synchronize their VLAN dBase to it
- **VTP SERVERS also function as VTP CLIENTS**
  - **THEREFORE, a VTP SERVER will synchronize to another VTP SERVER with a higher Revision Number**

One danger of VTP: Connecting an old SWITCH with higher Revision Number to network (and if the VTP Domain Name matches), all SWITCHES in Domain will synchronize their VLAN dBase to SWITCH

VTP CLIENTS:

```
(config)# vtp mode client
```

- Cannot Add / Modify / Delete VLANs
- Does NOT store the VLAN database in NVRAM
  - **VTP v3 CLIENTS DO**
- Will synchronize their VLAN dBase to the SERVER with the highest version number in their VTP Domain
- Advertise their VLAN dBase and forward VTP Advertisements to other CLIENTS over TRUNK Ports

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VTP TRANSPARENT MODE:

```
(config)# vtp mode transparent
```

- Does NOT participate in VTP Domain (does NOT sync VLAN database)
- Maintains own VLAN dBase in NVRAM.
- Can Add / Modify / Delete VLANs
- Won't Advertise to other SWITCHES
- Will forward VTP advertisements to SWITCHES in the same Domain as it.

VTP DOMAINS

If a SWITCH with no VTP Domain (Domain NULL) receives a VTP advertisement with a VTP Domain name, it will automatically join that VTP Domain

If a SWITCH receives a VTP advertisement in the same VTP domain with a higher revision number, it will update it's VLAN database to match

---

REVISION NUMBERS:

There are TWO ways to RESET a REVISION NUMBER to 0:

- Change VTP Domain to an unused Domain
- Change VTP mode to TRANSPARENT

VTP VERSION NUMBER

```
(config)#vtp version <version number>
```

Changing the Version # will force sync/update all connected SWITCHES to the latest Version #