12. Examination of VTP modes

VTP as Vlan trunking protocol make management of VLAN database across network simply but is proprietary. VTP allows configure appropriate VLANs on one switch (VTP server) and then propagate these VLANs to whole network (Other VTP server with lover revision number or other VTP clients).

But be careful when adding preconfigured switch - higher revision number take precedents and will populate preconfigured VLANs to entire network. Possibly best thing that you can du is change VTP domain name to another and then to expected because change in VTP domain name reset revision number to zero. Higher revision number mean "I have more accurate information about what is in network expected to do".

Benefits of use VTP are:

- consistency in VLAN across network
- dynamic trunk configuration when VLANs are introduced to network

In VTP terminology we must concern with these terms

- VTP domain one or more interconnecting switch same VLAN configured. L3 devices dictate domain boundary.
- VTP advertisements distribute and synchronize VLANs
- VTP modes defines interaction with spread advertisements of VTP protocol across network
- VTP pruning restrict flooding traffic to switches where are not appropriate VLANs. Help save available bandwidth on network trunks.

VTP modes are:

- VTP Server (default mode) advertise VTP domain VLAN information to other enabled SW in same VTP domain (store VLAN info in NVRAM!!!). From server can be VLAN created, renamed or deleted.
- 2. VTP client only stores VLAN info. Is not default vtp mode client CLI command must be configured. can not any way change configured VLANs as server mode can, but accept server made changes (exception is higher revision number that can harm whole network – please before adding used switch to existing network reset revision number!!!!).
- 3. VTP transparent forward VTP advertisement but do not participate on VTP.

Now we can take closer look at our training lab. Preconfigured scenario can be obtained from here (PKT 5.2 or above).



VTP modes and VLAN synchronization through L2 domain

All switches participate on same VTP domain with name: myLab (please remember that names are case sensitive!!!). Switch S1 act as VTP server and can introduce and change VLAN to network. S4 is client switch that will accept VLANs modified

by VTP server S1. Storage and administrative devices are connected to two switches S2 and S3. These are VTP transparent and contain only private VLAN 40 but trunk link between S1-S2-S3-S4-Inter VLAN router must be allowed for all VLAN (is default but show interface trunk and per trunk configured switchport trunk allowed vlan nr.nr, .. can help correct errors wen occur.).

Inter VLAN communication (reachability is enabled by router on a stick Inter VLAN router. If some access are expected be prohibited (access from clients to administrative VLAN with other ports as 80 and 443or 53 then appropriate access list must be created and assigned on appropriate interface to take effect.)

Now we can examine our topology:

 Status of VTP enabled protocol on S1 is displayed after typing command show vtp status under privileged exec mode or after do under other config modes

Physical Config CLI	Physical Config CLI
IOS Command Line Interface	IOS Command Line Interface
VINESPONSE Subject Link Protocol on Interface FastEthernet0/20, changed state to up *LINK-5-CHANGED: Interface FastEthernet0/20, changed state to up *LINK-5-CHANGED: Interface FastEthernet0/20, changed state up *LINEPDOTO-5-UPDOWN: Line protocol on Interface FastEthernet0/20, changed state up *LINEPDOTO-5-UPDOWN: Line protocol on Interface FastEthernet0/20, changed state up *LINEPDOTO-5-UPDOWN: Line protocol on Interface FastEthernet0/20, changed state up *Sibenable Spreading VLANs among servers and clients Sibenable * *UTP Version : 2 *UTP Version : 2 *UTP Server must be same on all sw in domain *UTP Prenain Name : Bisebled *UTP Traps Generation : Disabled *UTP Traps Generation : Disabled *UD5 digest : 0.0.0.0 (no valid interface found) *It : *It *	<pre>\$LINEPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/20, changed state to up \$LINEFS-CHANGED: Interface FastEthernet0/2, changed state to up \$LINEFROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state t o up VTP Client \$4>enable \$4\$e</pre>
Messages pass through but non intact tra	Spätent 53
IOS Command Line Interface	Physical Config CLI
<pre>\$LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state t o up \$LINEF-5-CHANGED: Interface FastEthernet0/5, changed state to up \$LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state t o up</pre>	LINEPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state t up LINK-S-CHANGED: Interface FastEthernet0/5, changed state to up LINEPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state t o up
S2>enable S2*show vtp status VTP Version : 2 Configuration Revision : 0 Maximum VLANs supported locally : 255 number have been not altering Number of existing VLANs : 9 VTP Operating Mode : Transparent VTP Domain Name : myLab VTP Druning Mode : Disabled VTP V2 Mode : Disabled VTP V2 Mode : Disabled VTP Trans Generation : Disabled MD5 digest : 0x41 0x08 0x06 0x98 0xDD 0x68 0x67 0x57 Configuration last modified by 0.0.0.0 at 3-1-93 00:25:54 S2#	S3>enable S3#show vtp status VTP Version : 2 Configuration Revision : 0 Maximum VLANs supported locally : 255 Number of existing VLANs : 5 VTP Operating Mode : Transparent VTP Praining Mode : Disabled VTP V2 Mode : Disabled VTP V2 Mode : Disabled VTP Traps Generation : Disabled VTP Traps Generation : Disabled VTP Traps Generation : Disabled VTP State

- 2. VLANs spread from S1 to S4 does not alter config on S3 and S2 in transparent mode.
- 3. Examination of allowed VLANs on trunk link among switches show interface trunk

IOS Command Line Interface 0 VLAND020 extrem Ref/15, Ref/17, Ref/18, TR/17, TR/18, TR/18, TR/18, TR/18, TR/18, TR/18, TR/18, T			
2 VLANGOD sective Fac/15, Fac/	IOS	Command Line Interface	IOS Command Line Interface
<pre>9 ULMBOOD sective The/25, The/25,</pre>	ULAN0020	active Fa0/15, Fa0/16, Fa0/17, Fa0/18 Fa0/19	40 VLAN0040 active Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/5
<pre>b VLANDOOD sective From From From From From From From From</pre>	VLAN0030	active Fa0/20, Fa0/21, Fa0/22, Fa0/23	1002 fddi-default active
25 F20/9 26 F304 26 F304 27 F304 28 F304 29 F304 20 F304 20 F304 21 1.02 22 F304 23 F304 24 F304 25 MOSA 26 F304 27 F304 28 F304 29 F304 20 F304 21 F304 21 F304 21 F304 21 F304 21 F304 21 F304 22 F314 23 F304 24 F	VLAN0040	active Fa0/5, Fa0/6, Fa0/7, Fa0/8	1003 token-ring-defailt active
j blackstring-default settive	2 fddi-default	Fa0/9 active	1005 trnet-default active S4Eshow int trunk
<pre>4 Editar-default active struking i active struk s</pre>	3 token-ring-default	active	Port Mode Encapsulation Status Native vlan
<pre>b trace-actual active interval in active interval in an agreement domain in the interval interval</pre>	4 fddinet-default	active	Fa0/1 on B02.1q trunking 1
Interview Proceeding at the set of set o	5 trnet-default	active	Fa0/2 on B02.1q trunking 1
/1 on \$02.1q trunking 1 2 00 \$02.1q trunk switchports 5 Vians allowed on trunk switchports \$20/2 1-1005 5 Vians allowed and active in management domain \$1,10,20,30,40 7 Vians in spanning tree forwarding state and not pruned \$20/2 1,10,20,30,40 7 Vians in spanning tree forwarding state and not pruned \$20/2 1,10,20,30,40 7 Vians in spanning tree forwarding state and not pruned \$20/2 1,10,20,30,40 7 Vians in spanning tree forwarding state and not pruned \$20/2 \$20,20,40 7 Vians in spanning tree forwarding state and not pruned \$20/2 \$20,20,40 8 Copy Paste \$20 9 Copy Paste \$20 9 Sommand Line Interface \$20 \$20 1002 fddi-default active \$20/2 \$20/2 1002 fddi-default active \$20/2 \$20/2 1002 fddi-default active \$20/2 \$20/2 1002 fddi-default<	t Mode Encaps	Native vian enumeration of	ftrunk Port Vlans allowed on trunk
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Views allowed and active in management domain /2 1,10,20,30,40 Port Views in spanning tree forwarding state and not pruned #a0/2 1,10,20,30,40 b Views in spanning tree forwarding state and not pruned #a0/2 1,10,20,30,40 copy Paste Copy	t Vlans allowed on to /1 1-1005	runk	Port Vlans allowed and active in management domain
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t Vlans in spanning tree forwarding state and not pruned // 1, 10, 20, 30, 40 Fa// 1, 10, 20, 30, 40		sinciation of anothed volities propagated on training delate	Port Vlans in spanning tree forwarding state and not pruned
/1 1,10,20,30,40 Paste Paste Copy Paste Sical Config CLI Config CLI IOS Command Line Interface Fa0/5 Fa0/2 1,10,20,30,40 Sical config CLI IOS Command Line Interface VLMN0040 active Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/2 Fa0/2 Si Cohen-ring-default active Copy Tation B02.1q trunking 1 Fao/1 Ion B02.1q trunking 1 <t< td=""><td>t Vlans in spanning t</td><td>tree forwarding state and not pruned</td><td>E Fa0/1 1,10,20,30,40</td></t<>	t Vlans in spanning t	tree forwarding state and not pruned	E Fa0/1 1,10,20,30,40
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t Vians in spanning tree forwarding state and not pruned 1,10,20,30,40 Port Vians in spanning tree forwarding state and not pruned	sical Config CLI IOS VLAN0040 22 fddi-default 33 token-ring-default 45 ddinat-default 55 tract-default 55 tract-default 55 mont-default 55 Mode Encep 1/1 on 802.1 ct Vlans allowed on t 1/2 i-1005 ct Vlans allowed and 1/1 1,10,20,30,40	Command Line Interface Zev/24 active Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9 active active active sulation Status Native vlan q trunking 1 trunking 1 trunking 1 trunking 1 trunking 1	S3 Physical Config CLI IOS Command Line Interface INV/F, Fa0/6, Fa0/7, Fa0/8 Fa0/9 1002 fddi-default active 1004 fddinet-default active 1004 fddinet-default active 1005 tinet-default active in management domain 1007 to Vlans allowed and active in management domain 1007 to Vlans allowed and active in management domain
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F=0/1 1 10 20 30 40	sical Config CLI IOS VLAN0040 22 fddi-default 34 token-ring-default 34 token-ring-default 35 token-ring-default 35 token-ring-default 36 token-ring-default 37 token-ring-defa	Command Line Interface Tav/s active Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9 active activ	\$3 Physical Config CLI IOS Command Line Interface 1002 fddi-default active 1002 fddi-default active 1003 folken-ring-default active 1004 fddinet-default active 1005 trnet-default 1005 trnet-default 1007 true 1008 trnet-default 1009 true 1000 true
0/2 1,10,20,30,40	vsical Config CLI IOS VLAN0040 02 fddi-default 03 tokkn-ring-default 04 fddinat-default 05 trnat-default 96 trnat-default 96 trnat-default 96 trnat-default 96 trnat-default 97 on 90/1 on 90/2 on 90/2 1-1005 90/2 1,00,20,30,40 90/2 1,00,20,0,040 90/2 1,10,20,30,40	Command Line Interface Faures active Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9 active active active active sulation Status Native vlan q trunking 1 q trunking 1 trunk active in management domain briant for pass through communication S1-S4 - Inter VLAN trees forwarding state and not pruned	Yes Physical Config CLI Interface 1002 fddi-default active 1002 fddi-default active 1004 fddinet-default active 1005 token-ring-default active 1004 fddinet-default active 1005 token-ring-default active 1004 fddinet-default stive S3#show int trunk Port Port Vlans allowed on trunk Fa0/1 1-1005 Port Pa0/2 1,10,20,30,40 Pa0/2 Port Vlans in spanning tree forwarding state and not pruned

Because default are allowed all VLANs to propagate across trunk, no additional commands are necessary – but keep in mind that they must be allowed or somebody for security reasons can enable only appropriate VLANs.

4. A bit confusing *output from show running-config*. You would by surprised where are all VTP config commands and VLANs that you created. But no worry, they are stored in vlan.dat in router flash. Vtp config can be examined with earlier mentioned commands. But next figure will explain something that you can be interested in.

and the second			
Physical Co	onfig CLI	My VTP com	mands and VLAN are missing from running-config
		Where are to IOS Command	hey? I Line Interface
line vty 0 4 login line vty 5 1 login ! ! end	1	in show running -c configuration com VLANs - VLANs are firmware of switch	onfig you cann not spot VTP mands and commands creating stored in vlan.dat file on flas along
S1 <u>#dir flash</u> Directory of 1 -rw- 2 -rw-	1: flash:/ 4414921 796	<no date=""></no>	firmware - IOS file c2960-lanbase-mz.122-25.FX.bin vlan.dat
64016384 byt S1#cd flash: ^ % Invalid in	es total (5	9600667 bytes free) d at '^' marker.	VTP server switch store its VLAN configs in vlan.dat - client only in running-config in RAM
S1‡more flas S1‡	sh:vlan.dat	unix like command ir is in PKT environmen device it will work	tegrated in IFS (integrated file system) of IOS t not suppoted (simulated) - but on real Copy Paste
3 52	_		
S2 Physical C	onfig CLI	nale of UR and/or	
S2 Physical C	onfig CLI	IOS Comman	d Line Interface
S2 Physical C	onfig CLI	IOS Command	d Line Interface
S2 Physical C Fa0/1 Fa0/2	onfig CLI Mode on on	IOS Comman Encapsulation St 802.1q tr 802.1q tr	d Line Interface
S2 Physical C Fa0/1 Fa0/2 Port Fa0/1 Fa0/2	onfig CLI Mode on on Vlans allow 1-1005 1-1005	IOS Command Encapsulation St 802.1q tr 802.1q tr 802.1q tr wed on trunk	d Line Interface
S2 Physical C Fa0/1 Fa0/2 Port Fa0/1 Fa0/2 Port Fa0/1 Fa0/1 Fa0/2 Port Fa0/1 Fa0/2	onfig CLI mode on on Vlans allow 1-1005 1-1005 Vlans allow 1,10,20,30, 1,10,20,30,	IOS Command Encepturation St 802.1q tr 802.1q tr 802.1q tr wed on trunk wed and active in ma .40 .40	d Line Interface
S2 Physical C Fa0/1 Fa0/2 Port Fa0/2 Port Fa0/1 Fa0/2 Port Fa0/1 Fa0/2 Port Fa0/1 Fa0/2 S2# S2#show flat Directory of	onfig CLI mode on on Vlans allow 1-1005 1-1005 Vlans allow 1,10,20,30, 1,10,20,30, 1,10,20,30, 1,10,20,30, sh: f flash:/	IOS Command Encapsuration St 802.1q tr 802.1q tr 802.1q tr wed on trunk wed and active in ma 40 40 40	d Line Interface
S2 Physical C Fa0/1 Fa0/2 Port Fa0/1 Fa0/2 Port Fa0/1 Fa0/2 Port Fa0/1 Fa0/2 Port Fa0/1 Fa0/2 S2# S2#show flat Directory of 1 -rw- 2 -rw-	onfig CLI Mode on on Vlans allow 1-1005 1-1005 Vlans allow 1,10,20,30, 1,10,20,30, Vlans in sp 1,10,20,30, 1,10,20,30, sh: f flash:/ 4414921 796	IOS Command Encapsulation St 802.1q tr 802.1q tr wed on trunk wed and active in ma 40 40 panning tree forward 40 40 1 <no dates<br="">5 <no dates<="" td=""><td>d Line Interface</td></no></no>	d Line Interface

5. Example of real message exchange in training environment – web access. When there are devices on different VLANs they must communicate through L3 device (L3 traditional routing scenario, Router on a stick or introducing SVI interfaces on L3 capable switch). Now it is important feel all protocols that support exchange of messages through our network – HTTP, DNS, TCP, IP, 802.2 LLC, 802.3 Ethernet, ARP, routing protocols if needed, VTP, STP, CDP (on cisco network but all managed network use something), SNMP for management ... and many many others. That all lies beneath network exchange of our communication (ICQ, e-mail, facebook, youtube, skype, VoIP ...).

