



Jungwo University

대구 캠퍼스 내부망 구축 사업

- 결 과 보 고 서 -

개요

구축 내용

구축 기술

기타



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구축 배경 및 목적



정우대학교 대구캠퍼스 내부망 구축 사업

- ※ 사업 목적 : 정우대학교 신설 캠퍼스 내부망 구축
- ※ 사업 금액 : 450,000,000원
- ※ 사업 기간 : 계약일로부터 6주 이내 (구축 후 2년 유지보수 무상)
- ※ 사업 위치 : 정우대학교 대구 캠퍼스

네트워크 구축 목표

- ※ 안정적인 운영
- ※ 인프라 안정화
- ※ 고품질의 서비스
- ※ 내부 보안 강화

사업
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사업
범위

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목표

추진
배경

사업 범위

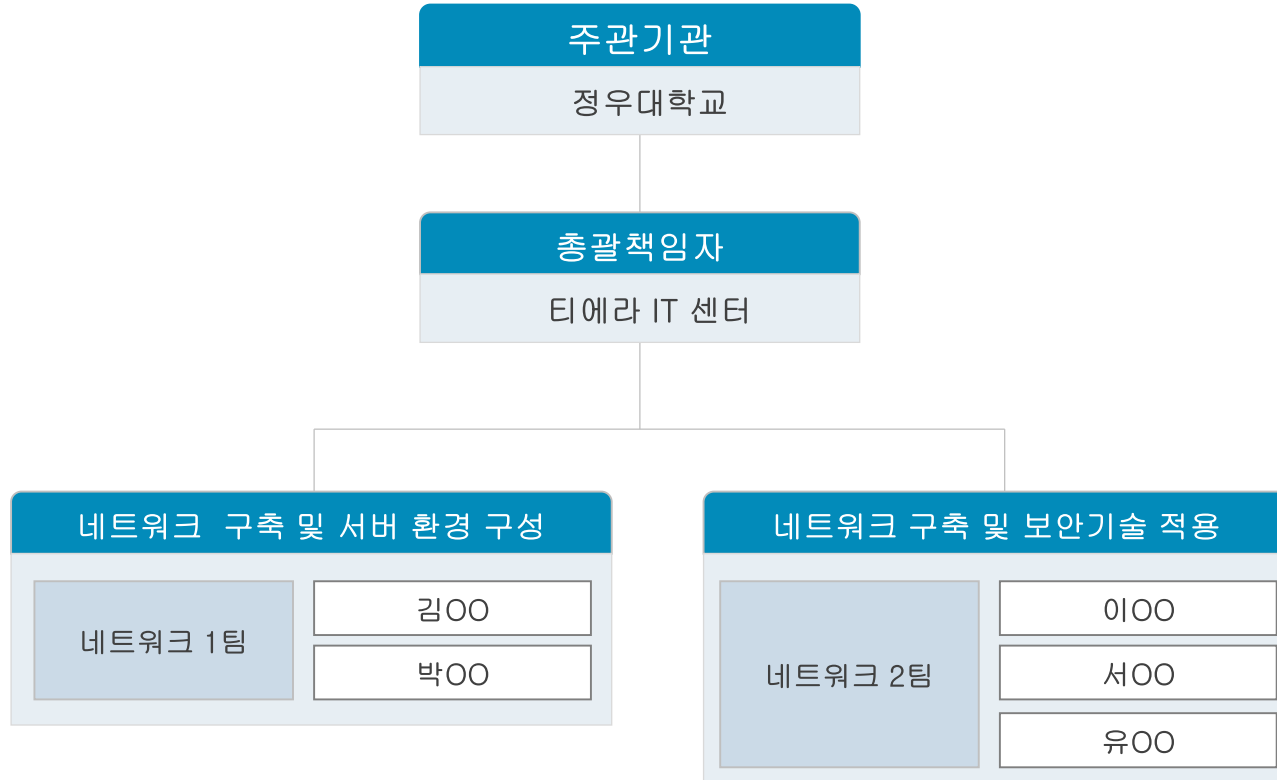
- ※ 내부 인트라넷
- ※ 학사 총괄 행정 시스템
- ※ 캠퍼스내 모든 건물 내부네트워크 구축
- ※ DB 암호화 솔루션

사업 추진 배경

- ※ 대구 신설 캠퍼스의 내부 인프라 구축
- ※ 인프라 안정을 위한 이중화 환경 제공
- ※ 사고 방지를 위한 보안네트워크 구축
- ※ 차세대 시스템 구축으로 교육서비스 극대화



구축 전담 조직도





구축 장비 및 내용(1/3)



Cisco 2801 Router

플래시 메모리	기본: 64MB 최대: 128MB	소비전력	150W
AC-IP 입력전류	2A(110V)	AC 입력전원	100-240VAC
이더넷 포트	10/100Mbps 내장형 라우팅 포트 2개	주파수	47 - 63 Hz
콘솔포트	1	보조포트	1
옵션 통합 직렬식 전원	0,AC-IP 전원 공급 장치 필요	작동온도	32 ~ 104 °F (0 ~ 40 °C)
콘솔포트	1(최대 115.2 kbps)	소음 레벨	정상 동작 온도 시 : 39 dBA 최대 팬 속도 시 :53.5dBA
크기 (높이x가로x세로)	1.72 x 17.5 x 16.5 인치	무게	13.7lb(6kg)



구축 장비 및 내용(2/3)

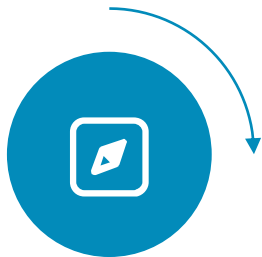


Cisco 3550-24 Switch

플래시 메모리	16MB	DRAM	64MB
최대 VLAN	1005	802.1Q 및 ISL	지원
스위칭 패브릭	8.8Gbps	멀티캐스트	라우팅 프로토콜(PIM) IGMP 스누핑
포트	10/100 포트 24개 기가비트 이더넷포트 2개	CiscoWorks	VAN 관리 솔루션 Ciscoview,QPM,ACS,URT, SNMS,IMP,Service Level Manager
무게	5.0Kg	크기 (높이 x 가로 x 세로)	1.75 x 17.5 x 14.4 inch



구축 장비 및 내용(3/3)

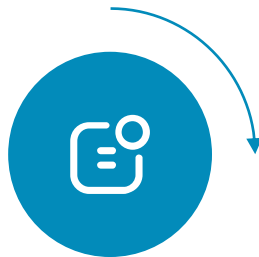


가용성, 확장성

신속하고 정확한 트래픽 전송 및
장비부하를 최소화하며, 신속한
장애조치 및 안정적인 운용

이중화, 보안성

HSRP를 구성하여 장애 발생에 따른
안정적 환경을 마련하고,
외부에서 중요서버에 접근 불가능하게
보안설정

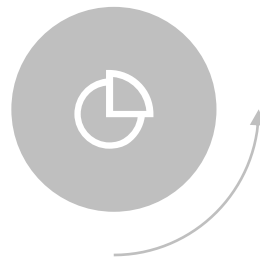


내부 네트워크 구축

Ether Channel , RSTP
Inter-Vlan
Portfast, HSRP, Trunk

서버 환경 구축

DHCP/FTP Server
Web/DNS Server
Intranet Server
E-mail Server



[illegible]



2

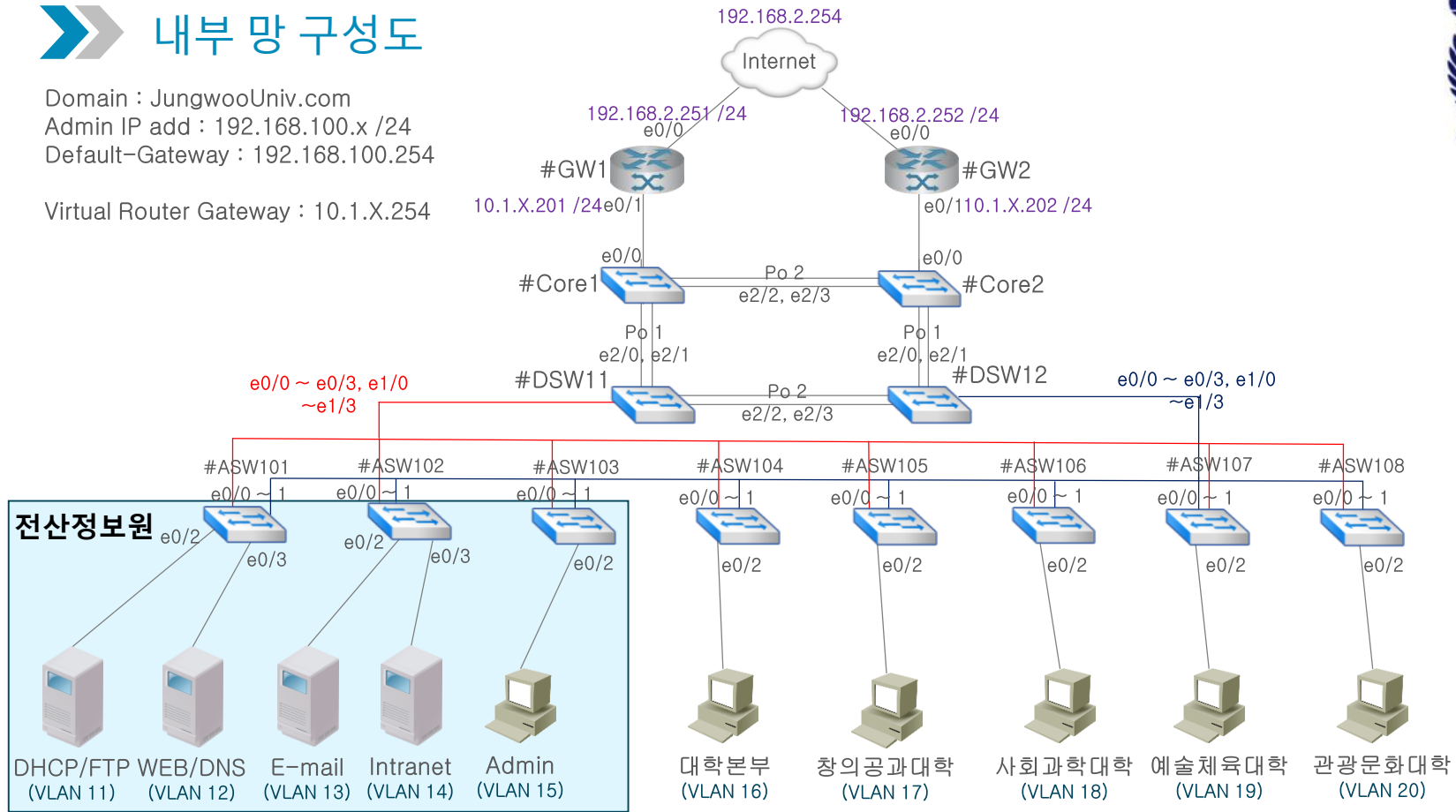
내부 네트워크 구축 내용

1. 내부 망 구성도
2. 구축 프로세스 및 기술 요약
3. 네트워크 IP 할당 내역

내부 망 구성도

Domain : JungwooUniv.com
Admin IP add : 192.168.100.x /24
Default-Gateway : 192.168.100.254

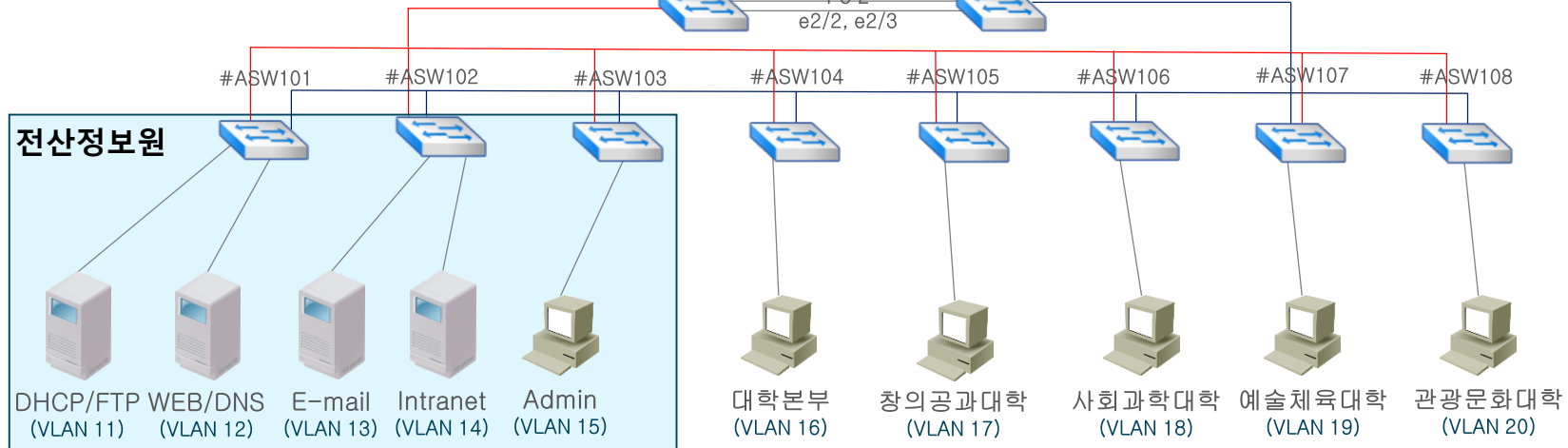
Virtual Router Gateway : 10.1.X.254



구축 프로세스 및 기술 요약

Cisco 2801 Router * 2
Cisco 3550 Switch * 12

1. Basic Configuration, VLAN
2. Ether Channel, Trunk, RSTP
3. Portfast, PVST, HSRP
4. 기본 & 정적 경로 구성
5. Web 을 제외한 나머지 서버 외부접근금지



※ PVST

Vlan 11 ~ 15

ASW X - DSW11 - Core1 - GW1

Vlan 16 ~ 20

ASW X - DSW12 - Core2 - GW2

※ HSRP

Vlan 11 ~ 15 : GW1(Active) GW2(Standby)

Vlan 16 ~ 20 : GW2(Active) GW1(Standby)





네트워크 IP 할당 내역(1/2)



장비/모델명	상세구간	Interface	Ether Channel	네트워크	IP Address	VLAN
Cisco 2801 (Route)	GW1	e0/0		192.168.2.0 /24	192.168.2.251	
		e0/1.1		192.168.100.0 /24	192.168.100.201	
		e0/1.x		10.1.0.0 /16	10.1.X.201	
	GW2	e0/0		192.168.2.0 /24	192.168.2.252	
		e0/1.1		192.168.100.0 /24	192.168.100.202	
		e0/1.x		10.1.0.0 /16	10.1.X.202	
Cisco 3550 (Switch)	Core1	Virtual	Po1(e2/0, e2/1) Po2(e2/2, e2/3)	192.168.100.0 /24	192.168.100.1	
	Core2	Virtual	Po1(e2/0, e2/1) Po2(e2/2, e2/3)	192.168.100.0 /24	192.168.100.2	
	DSW11	Virtual		192.168.100.0 /24	192.168.100.11	
	DSW12	Virtual		192.168.100.0 /24	192.168.100.12	
	ASW101	Virtual		192.168.100.0 /24	192.168.100.101	11, 12
	ASW102	Virtual		192.168.100.0 /24	192.168.100.102	13, 14
	ASW103	Virtual		192.168.100.0 /24	192.168.100.103	15
	ASW104	Virtual		192.168.100.0 /24	192.168.100.104	16
	ASW105	Virtual		192.168.100.0 /24	192.168.100.105	17
	ASW106	Virtual		192.168.100.0 /24	192.168.100.106	18
	ASW107	Virtual		192.168.100.0 /24	192.168.100.107	19
	ASW108	Virtual		192.168.100.0 /24	192.168.100.108	20



네트워크 IP 할당 내역(2/2)



장비/모델명	상세구간	IP개수	Gate-way	네트워크	IP Address	VLAN
-	DHCP / FTP	254	10.1.11.254	10.1.11.0 /24	10.1.11.1	11
	WEB / DNS	254	10.1.12.254	10.1.12.0 /24	10.1.12.1	12
	E-Mail	254	10.1.13.254	10.1.13.0 /24	10.1.13.1	13
	Intranet	254	10.1.14.254	10.1.14.0 /24	10.1.14.1	14
	Admin	254	10.1.15.254	10.1.15.0 /24	10.1.15.1	15
	대학본부	254	10.1.16.254	10.1.16.0 /24	10.1.16.10 ~ 10.1.16.250 (DHCP)	16
	창의공과대학	254	10.1.17.254	10.1.17.0 /24	10.1.17.10 ~ 10.1.17.250 (DHCP)	17
	사회과학대학	254	10.1.18.254	10.1.18.0 /24	10.1.18.10 ~ 10.1.18.250 (DHCP)	18
	예술체육대학	254	10.1.19.254	10.1.19.0 /24	10.1.19.10 ~ 10.1.19.250 (DHCP)	19
	관광문화대학	254	10.1.20.254	10.1.20.0 /24	10.1.20.10 ~ 10.1.20.250 (DHCP)	20



네트워크 구축 기술

1. 내부 네트워크 구축 기술
2. 서버 구축

Ether Channel

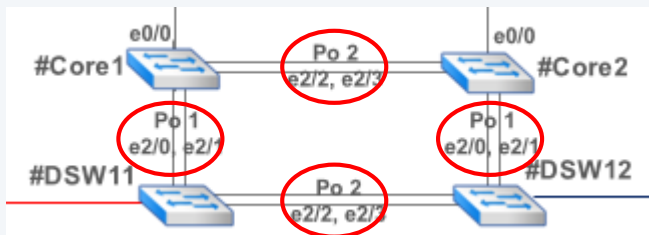
Ether Channel

기대 효과 & 구현 목표

※ 다수의 Ethernet Link 를 하나의 논리적인 Link 로 묶어 Bandwidth를 확장하여 성능 향상

※ Port 장애 발생 대비에 다른 이중화 Link 구현

※ Core – DSW 스위치 간의 다수의 Port 를 하나의 논리적인 Port 구성



Test and Set

Core 1 , Core 2

Number of channel-groups in use: 2				
Number of aggregators: 2				
Group	Port-channel	Protocol	Ports	
1	Po1(SU)	LACP	Et2/0(P)	Et2/1(P)
2	Po2(SU)	LACP	Et2/2(P)	Et2/3(P)

Core1#

Number of channel-groups in use: 2				
Number of aggregators: 2				
Group	Port-channel	Protocol	Ports	
1	Po1(SU)	LACP	Et2/0(P)	Et2/1(P)
2	Po2(SU)	LACP	Et2/2(P)	Et2/3(P)

Core2#

DSW11 , DSW12

Number of channel-groups in use: 2				
Number of aggregators: 2				
Group	Port-channel	Protocol	Ports	
1	Po1(SU)	LACP	Et2/0(P)	Et2/1(P)
2	Po2(SU)	LACP	Et2/2(P)	Et2/3(P)

DSW11#

Number of channel-groups in use: 2				
Number of aggregators: 2				
Group	Port-channel	Protocol	Ports	
1	Po1(SU)	LACP	Et2/0(P)	Et2/1(P)
2	Po2(SU)	LACP	Et2/2(P)	Et2/3(P)

DSW12#

내부 네트워크 구축 기술(2/7)



IEEE 802.1w RSTP (1/2)

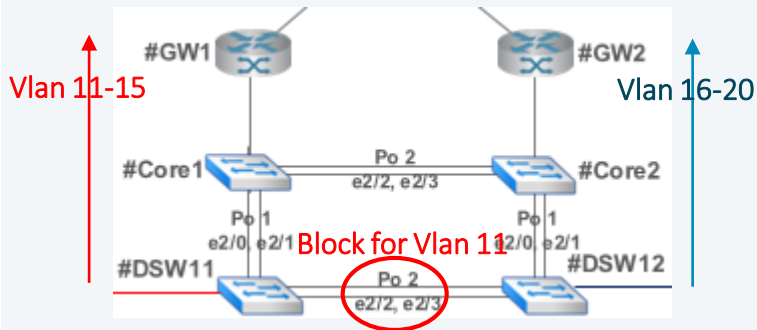
IEEE 802.1w RSTP

기대 효과 & 구현 목표

※ 기존 STP에 비해 포트 이전이 빠르고 신속한 RSTP 구현

※ 이중화링크에서 발생하는 Bridging Loop방지

※ BPDU 메시지를 통한 모니터링 실시
장애발생 및 복구 감시



Test and Set

Vlan 11 Forward & Blocking check

Core1#show spanning-tree vlan 11

```

VLAN0011
Spanning tree enabled protocol rstp
Root ID    Priority    4107
           Address    aabb.cc00.1000
           This bridge is the root
           Hello Time 2 sec    Max Age 20 sec    Forward Delay 15 sec

Bridge ID   Priority    4107 (priority 4096 sys-id-ext 11)
           Address    aabb.cc00.1000
           Hello Time 2 sec    Max Age 20 sec    Forward Delay 15 sec
           Aging Time 300 sec
    
```

Interface	Role	Sts Cost	Prio.Nbr	Type
Et0/0	Desg	FWD 100	128.1	shr Edge
Po2	Desg	FWD 56	128.65	shr
Po1	Desg	FWD 56	128.66	shr

DSW11#show spanning-tree vlan 11

```

VLAN0011
Spanning tree enabled protocol rstp
Root ID    Priority    4107
           Address    aabb.cc00.1000
           Cost        56
           Port        66 (Port-channel1)
           Hello Time 2 sec    Max Age 20 sec    Forward Delay 15 sec

Bridge ID   Priority    12299 (priority 12288 sys-id-ext 11)
           Address    aabb.cc00.3000
           Hello Time 2 sec    Max Age 20 sec    Forward Delay 15 sec
           Aging Time 300 sec
    
```

Interface	Role	Sts Cost	Prio.Nbr	Type
Et0/0	Desg	FWD 100	128.1	shr
Et0/1	Desg	FWD 100	128.2	shr
Et0/2	Desg	FWD 100	128.3	shr
Et0/3	Desg	FWD 100	128.4	shr
Et1/0	Desg	FWD 100	128.5	shr
Et1/1	Desg	FWD 100	128.6	shr
Et1/2	Desg	FWD 100	128.7	shr
Et1/3	Desg	FWD 100	128.8	shr
Po2	Desg	FWD 56	128.65	shr
Po1	Root	FWD 56	128.66	shr



IEEE 802.1w RSTP (2/2)

Test and Set

Vlan 11 Forward & Blocking check

```
Core2#show spanning-tree vlan 11
```

```
VLAN0011
Spanning tree enabled protocol rstp
Root ID    Priority    4107
           Address    aabb.cc00.1000
           Cost       56
           Port       65 (Port-channel2)
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID   Priority    8203 (priority 8192 sys-id-ext 11)
           Address    aabb.cc00.2000
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time  300 sec
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Desg	FWD	100	128.1	Shr Edge
Po2	Root	FWD	56	128.65	Shr
Po1	Desg	FWD	56	128.66	Shr

Test and Set

Vlan 11 Forward & Blocking check

```
DSW12#show spanning-tree vlan 11
```

```
VLAN0011
Spanning tree enabled protocol rstp
Root ID    Priority    4107
           Address    aabb.cc00.1000
           Cost       112
           Port       66 (Port-channel1)
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID   Priority    16395 (priority 16384 sys-id-ext 11)
           Address    aabb.cc00.4000
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time  300 sec
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Desg	FWD	100	128.1	Shr
Et0/1	Desg	FWD	100	128.2	Shr
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr
Et1/0	Desg	FWD	100	128.5	Shr
Et1/1	Desg	FWD	100	128.6	Shr
Et1/2	Desg	FWD	100	128.7	Shr
Et1/3	Desg	FWD	100	128.8	Shr
Po2	Altn	BLK	56	128.65	Shr
Po1	Root	FWD	56	128.66	Shr

Port Fast

Port Fast

기대 효과 & 구현 목표

※ 엔드 디바이스와 연결된 Port 에 적용

※ Port 를 즉시 활성화 하여
네트워크의 초기화 및 전송시간 단축

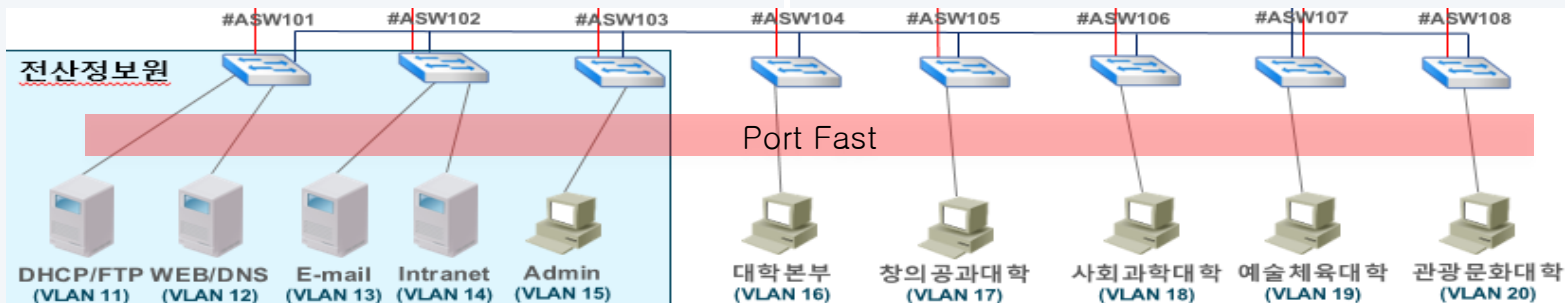
Test and Set

Core 1 & ASW101

```
interface Ethernet0/2
switchport access vlan 11
switchport trunk encapsulation dot1q
switchport mode access
spanning-tree portfast edge

interface Ethernet0/0
switchport trunk encapsulation dot1q
switchport mode trunk
duplex auto
spanning-tree portfast trunk

interface Ethernet0/3
switchport access vlan 12
switchport trunk encapsulation dot1q
switchport mode access
spanning-tree portfast edge
```

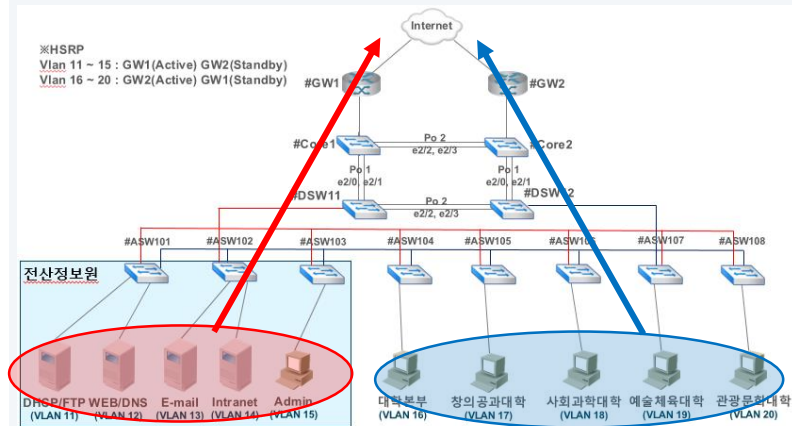


HSRP 및 로드분산 (1/3)

HSRP 및 로드분산

기대 효과 & 구현 목표

- ※ 가상의 Gateway 를 공유하는 Router를 이용
- ※ 장애 발생시 안정적인 네트워크 환경 구축
- ※ HSRP 를 이용하여 로드 분산 구축



Test and Set

GW 1

```
GW1#show standby bri
```

P indicates configured to preempt.

Interface	Grp	Pri	P	State	Active	Standby	Virtual IP
Et0/1.11	11	120	P	Active	local	10.1.11.202	10.1.11.254
Et0/1.12	12	120	P	Active	local	10.1.12.202	10.1.12.254
Et0/1.13	13	120	P	Active	local	10.1.13.202	10.1.13.254
Et0/1.14	14	120	P	Active	local	10.1.14.202	10.1.14.254
Et0/1.15	15	120	P	Active	local	10.1.15.202	10.1.15.254
Et0/1.16	16	100	P	Standby	10.1.16.202	local	10.1.16.254
Et0/1.17	17	100	P	Standby	10.1.17.202	local	10.1.17.254
Et0/1.18	18	100	P	Standby	10.1.18.202	local	10.1.18.254
Et0/1.19	19	100	P	Standby	10.1.19.202	local	10.1.19.254
Et0/1.20	20	100	P	Standby	10.1.20.202	local	10.1.20.254

GW 2

```
GW2#show standby brief
```

P indicates configured to preempt.

Interface	Grp	Pri	P	State	Active	Standby	Virtual IP
Et0/1.11	11	100	P	Standby	10.1.11.201	local	10.1.11.254
Et0/1.12	12	100	P	Standby	10.1.12.201	local	10.1.12.254
Et0/1.13	13	100	P	Standby	10.1.13.201	local	10.1.13.254
Et0/1.14	14	100	P	Standby	10.1.14.201	local	10.1.14.254
Et0/1.15	15	100	P	Standby	10.1.15.201	local	10.1.15.254
Et0/1.16	16	120	P	Active	local	10.1.16.201	10.1.16.254
Et0/1.17	17	120	P	Active	local	10.1.17.201	10.1.17.254
Et0/1.18	18	120	P	Active	local	10.1.18.201	10.1.18.254
Et0/1.19	19	120	P	Active	local	10.1.19.201	10.1.19.254
Et0/1.20	20	120	P	Active	local	10.1.20.201	10.1.20.254

내부 네트워크 구축 기술(6/7)

HSRP 및 로드분산 (2/3)



Test and Set

Admin PC (Man 15)에서 경로 추적

```
C:\Users\Administrator>tracert 192.168.2.254
```

최대 30홉 이상의 192.168.2.254(으)로 가는 경로 추적

```
 1      1 ms      1 ms      1 ms    10.1.15.201
 2      3 ms      3 ms      2 ms    192.168.2.254
```

추적을 완료했습니다.

장애 발생 (GW 1 e0/0 shutdown)

```
GW1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
GW1(config)#int e0/0
GW1(config-if)#shutdown
```

Test and Set

GW 1

```
*May 10 08:20:40.480: %TRACK-6-STATE: 10 interface Et0/0 line-protocol up -> Down
GW1(config-if)#
*May 10 08:20:40.506: %HSRP-5-STATECHANGE: Ethernet0/1.12 Grp 12 state Active -> Speak
*May 10 08:20:41.363: %HSRP-5-STATECHANGE: Ethernet0/1.13 Grp 13 state Active -> Speak
*May 10 08:20:41.380: %HSRP-5-STATECHANGE: Ethernet0/1.11 Grp 11 state Active -> Speak
GW1(config-if)#
*May 10 08:20:41.832: %HSRP-5-STATECHANGE: Ethernet0/1.14 Grp 14 state Active -> Speak
*May 10 08:20:42.119: %HSRP-5-STATECHANGE: Ethernet0/1.15 Grp 15 state Active -> Speak
*May 10 08:20:42.479: %LINK-5-CHANGED: Interface Ethernet0/0, changed state to administratively down
GW1(config-if)#
*May 10 08:20:43.484: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to down
GW1(config-if)#do sh
*May 10 08:20:51.062: %HSRP-5-STATECHANGE: Ethernet0/1.12 Grp 12 state Speak -> Standby
GW1(config-if)#do show
*May 10 08:20:52.271: %HSRP-5-STATECHANGE: Ethernet0/1.15 Grp 15 state Speak -> Standby
*May 10 08:20:52.427: %HSRP-5-STATECHANGE: Ethernet0/1.14 Grp 14 state Speak -> Standby
*May 10 08:20:52.480: %HSRP-5-STATECHANGE: Ethernet0/1.13 Grp 13 state Speak -> Standby
*May 10 08:20:52.932: %HSRP-5-STATECHANGE: Ethernet0/1.11 Grp 11 state Speak -> Standby
GW1(config-if)#do show standby bri
P indicates configured to preempt.
|
Interface  Grp  Pri  P State  Active      Standby      Virtual IP
Et0/1.11   11   90   P Standby 10.1.11.202 local        10.1.11.254
Et0/1.12   12   90   P Standby 10.1.12.202 local        10.1.12.254
Et0/1.13   13   90   P Standby 10.1.13.202 local        10.1.13.254
Et0/1.14   14   90   P Standby 10.1.14.202 local        10.1.14.254
Et0/1.15   15   90   P Standby 10.1.15.202 local        10.1.15.254
Et0/1.16   16   100  P Standby 10.1.16.202 local        10.1.16.254
Et0/1.17   17   100  P Standby 10.1.17.202 local        10.1.17.254
Et0/1.18   18   100  P Standby 10.1.18.202 local        10.1.18.254
Et0/1.19   19   100  P Standby 10.1.19.202 local        10.1.19.254
Et0/1.20   20   100  P Standby 10.1.20.202 local        10.1.20.254
```

내부 네트워크 구축 기술(7/7)

HSRP 및 로드분산 (3/3)



Test and Set

GW2

```
GW2#
*May 10 08:20:40.499: %HSRP-5-STATECHANGE: Ethernet0/1.12 Grp 12 state Standby -> Active
*May 10 08:20:41.357: %HSRP-5-STATECHANGE: Ethernet0/1.13 Grp 13 state Standby -> Active
*May 10 08:20:41.362: %HSRP-5-STATECHANGE: Ethernet0/1.11 Grp 11 state Standby -> Active
GW2#
*May 10 08:20:41.831: %HSRP-5-STATECHANGE: Ethernet0/1.14 Grp 14 state Standby -> Active
*May 10 08:20:42.114: %HSRP-5-STATECHANGE: Ethernet0/1.15 Grp 15 state Standby -> Active
```

Admin PC (Man 15)에서 경로 추적

C:\Users\Administrator>tracert 192.168.2.254

최대 30홉 이상의 192.168.2.254(으)로 가는 경로 추적

```
1      4 ms      2 ms      3 ms      10.1.15.202
2     10 ms      4 ms      3 ms      192.168.2.254
```

Test and Set

GW2

```
GW2#show standby brief
P indicates configured to preempt.

```

Interface	Grp	Pri	P	State	Active	Standby	virtual IP
Et0/1.11	11	100	P	Active	local	10.1.11.201	10.1.11.254
Et0/1.12	12	100	P	Active	local	10.1.12.201	10.1.12.254
Et0/1.13	13	100	P	Active	local	10.1.13.201	10.1.13.254
Et0/1.14	14	100	P	Active	local	10.1.14.201	10.1.14.254
Et0/1.15	15	100	P	Active	local	10.1.15.201	10.1.15.254
Et0/1.16	16	120	P	Active	local	10.1.16.201	10.1.16.254
Et0/1.17	17	120	P	Active	local	10.1.17.201	10.1.17.254
Et0/1.18	18	120	P	Active	local	10.1.18.201	10.1.18.254
Et0/1.19	19	120	P	Active	local	10.1.19.201	10.1.19.254
Et0/1.20	20	120	P	Active	local	10.1.20.201	10.1.20.254

장애 복구 (GW 1 e0/0 no shutdown)

```
GW1(config-if)#no shutdown
GW1(config-if)#
*May 10 08:27:44.119: %TRACK-6-STATE: 10 interface Et0/0 line-protocol down -> up
GW1(config-if)#
*May 10 08:27:44.785: %HSRP-5-STATECHANGE: Ethernet0/1.14 Grp 14 state Standby -> Active
*May 10 08:27:45.193: %HSRP-5-STATECHANGE: Ethernet0/1.11 Grp 11 state Standby -> Active
*May 10 08:27:45.212: %HSRP-5-STATECHANGE: Ethernet0/1.13 Grp 13 state Standby -> Active
*May 10 08:27:45.627: %HSRP-5-STATECHANGE: Ethernet0/1.12 Grp 12 state Standby -> Active
GW1(config-if)#
*May 10 08:27:46.119: %LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
GW1(config-if)#
*May 10 08:27:46.894: %HSRP-5-STATECHANGE: Ethernet0/1.15 Grp 15 state Standby -> Active
*May 10 08:27:47.123: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to up
```



서버 구축 (1/3)

DHCP



DHCP

Test

서버 관리자(WIN2008)

- 역할
 - Active Directory 인증서
 - DHCP 서버
 - win2008
 - IPv4
 - 범위 [10.1.11]
 - 범위 [10.1.12]
 - 주소 풀

시작 IP 주소	끝 IP 주소	설명
10.1.12.10	10.1.12.250	배포에 대한 주소 범위
 - 주소 임대
 - 예약
 - 범위 옵션
 - 범위 [10.1.13]
 - 범위 [10.1.14]
 - 범위 [10.1.15]
 - 범위 [10.1.16]
 - 범위 [10.1.17]
 - 범위 [10.1.18]
 - 범위 [10.1.19]
 - 범위 [10.1.20]
 - 서버 옵션
 - 필터
 - IPv6
 - 웹 서버(IIS)
 - 기능
 - 진단
 - 구성
 - 저장소

Test and Set

Test (Man 15)

```
VPCS> ip dhcp
DORA IP 10.1.15.10/24 GW 10.1.15.254

VPCS> show ip

NAME           : VPCS[1]
IP/MASK        : 10.1.15.10/24
GATEWAY       : 10.1.15.254
DNS           : 10.1.12.1 168.126.63.1
DHCP SERVER   : 10.1.11.1
DHCP LEASE    : 691193, 691200/345600/604800
DOMAIN NAME   : JungwooUniv.com
MAC           : 00:50:79:66:68:0c
LPORT        : 20000
RHOST:PORT    : 127.0.0.1:30000
MTU           : 1500
```

Test (Man 16)

```
VPCS> ip dhcp
DORA IP 10.1.16.11/24 GW 10.1.16.254

VPCS> show ip

NAME           : VPCS[1]
IP/MASK        : 10.1.16.11/24
GATEWAY       : 10.1.16.254
DNS           : 10.1.12.1 168.126.63.1
DHCP SERVER   : 10.1.11.1
DHCP LEASE    : 691195, 691200/345600/604800
DOMAIN NAME   : JungwooUniv.com
MAC           : 00:50:79:66:68:0d
LPORT        : 20000
RHOST:PORT    : 127.0.0.1:30000
MTU           : 1500
```

» 서버 구축 (2/3)

FTP



FTP	Test and Set
<div>Test</div>	<div>Test (Admin)</div> <pre> C:\Users\Administrator>ftp 10.1.11.1 10.1.11.1에 연결되었습니다. 220 Microsoft FTP Service 사용자(10.1.11.1:(none)): user1 331 Password required for user1. 암호: 230 User logged in. ftp> quit 221 Goodbye. </pre> <div>Test (User)</div> <pre> C:\Users\Administrator>ftp 10.1.11.1 10.1.11.1에 연결되었습니다. 220 Microsoft FTP Service 사용자(10.1.11.1:(none)): user2 331 Password required for user2. 암호: 230 User logged in. ftp> quit 221 Goodbye. </pre>

서버 구축 (3/3)

WEB / DNS

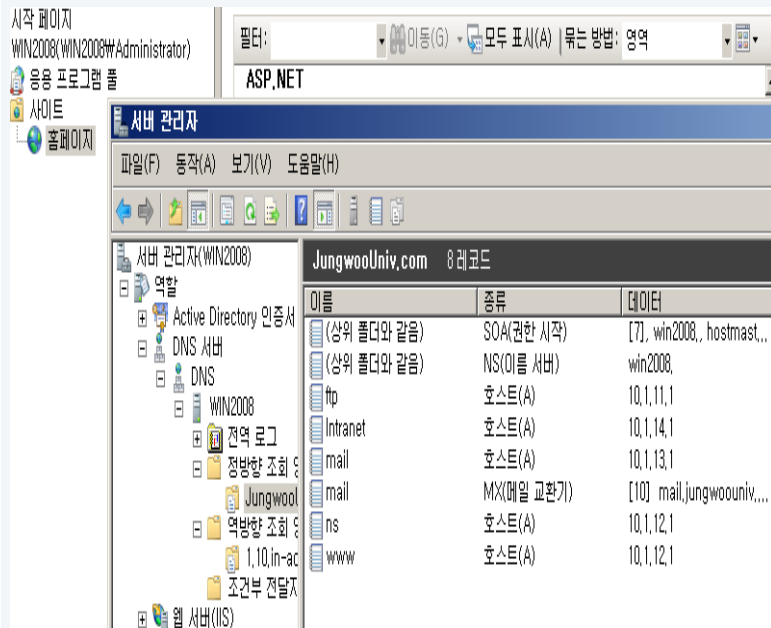


WEB / DNS

Test and Set

Test

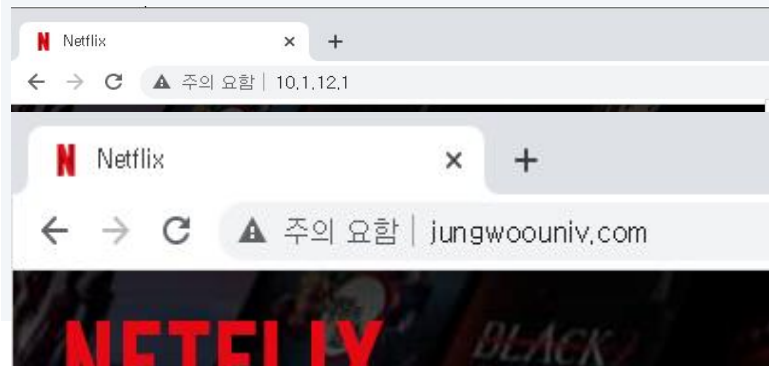
Test (NSlookup)



```
C:\Users\Administrator>nslookup 10.1.12.1
서버: ns.jungwooniv.com
Address: 10.1.12.1
```

```
이름: www.jungwooniv.com
Address: 10.1.12.1
```

Test (Connect)





기타

1. Cisco 명령어



대표 Router

GW 1

```
en
conf t
hostname GW1
!
enable secret cisco
no ip domain-lookup
no cdp run
!
line con 0
logg syn
exec-timeout 0 0
!
line vty 0 4
logg syn
exec-timeout 0 0
transport input all
password jungwoovy
login
end
```

```
conf t
int e0/1
no shutdown
!
int e0/1.1
encapsulation dot1q 1
ip address 192.168.100.201
255.255.255.0
!
int e0/1.11
encapsulation dot1q 11
ip address 10.1.11.201 255.255.255.0
!
int e0/1.12
encapsulation dot1q 12
ip address 10.1.12.201 255.255.255.0
!
int e0/1.13
encapsulation dot1q 13
ip address 10.1.13.201 255.255.255.0
```

```
int e0/1.14
encapsulation dot1q 14
ip address 10.1.14.201 255.255.255.0
!
int e0/1.15
encapsulation dot1q 15
ip address 10.1.15.201 255.255.255.0
!
int e0/1.16
encapsulation dot1q 16
ip address 10.1.16.201 255.255.255.0
!
int e0/1.17
encapsulation dot1q 17
ip address 10.1.17.201 255.255.255.0
!
int e0/1.18
encapsulation dot1q 18
ip address 10.1.18.201 255.255.255.0
!
int e0/1.19
encapsulation dot1q 19
ip address 10.1.19.201 255.255.255.0
!
int e0/1.20
encapsulation dot1q 20
ip address 10.1.20.201 255.255.255.0
end
```



대표 Router

GW 1

```
conf t
int e0/0
ip address 192.168.2.251
255.255.255.0
no shutdown
!
ip route 0.0.0.0 0.0.0.0 192.168.2.254
End

conf t
access-list 10 permit 10.1.0.0
0.0.255.255
!
ip nat inside source list 10 int e0/0
overload
!
int e0/0
ip nat outside
!
```

```
int e0/1.1
ip nat inside
!
int e0/1.11
ip nat inside
!
int e0/1.12
ip nat inside
!
int e0/1.13
ip nat inside
!
int e0/1.14
ip nat inside
!
int e0/1.15
ip nat inside
!
```

```
int e0/1.16
ip nat inside
!
int e0/1.17
ip nat inside
!
int e0/1.18
ip nat inside
!
int e0/1.19
ip nat inside
!
int e0/1.20
ip nat inside
!
end
```



대표 Router

GW 1

```
conf t
track 10 int e0/0 line-protocol
!
int e0/1.11
standby 11 ip 10.1.11.254
standby 11 priority 120
standby 11 preempt
standby 11 track 10 decrement 30
!
int e0/1.12
standby 12 ip 10.1.12.254
standby 12 priority 120
standby 12 preempt
standby 12 track 10 decrement 30
!
int e0/1.13
standby 13 ip 10.1.13.254
standby 13 priority 120
standby 13 preempt
standby 13 track 10 decrement 30
```

```
int e0/1.14
standby 14 ip 10.1.14.254
standby 14 priority 120
standby 14 preempt
standby 14 track 10 decrement 30
!
int e0/1.15
standby 15 ip 10.1.15.254
standby 15 priority 120
standby 15 preempt
standby 15 track 10 decrement 30
!
int e0/1.16
standby 16 ip 10.1.16.254
standby 16 preempt
!
int e0/1.17
standby 17 ip 10.1.17.254
standby 17 preempt
```

```
!
int e0/1.18
standby 18 ip 10.1.18.254
standby 18 preempt
!
int e0/1.19
standby 19 ip 10.1.19.254
standby 19 preempt
!
int e0/1.20
standby 20 ip 10.1.20.254
standby 20 preempt
!
end
```



대표 Router

GW 1

```
conf t
!  
int e0/1.1  
ip helper-address 10.1.11.1  
!  
int e0/1.11  
ip helper-address 10.1.11.1  
!  
int e0/1.12  
ip helper-address 10.1.11.1  
!  
int e0/1.13  
ip helper-address 10.1.11.1  
!  
int e0/1.14  
ip helper-address 10.1.11.1  
!
```

```
int e0/1.15  
ip helper-address 10.1.11.1  
!  
int e0/1.16  
ip helper-address 10.1.11.1  
!  
int e0/1.17  
ip helper-address 10.1.11.1  
!  
int e0/1.18  
ip helper-address 10.1.11.1  
!  
int e0/1.19  
ip helper-address 10.1.11.1  
!  
int e0/1.20  
ip helper-address 10.1.11.1  
!  
end
```

```
conf t  
!  
ip nat inside source static tcp 10.1.12.1 80  
192.168.2.251 80 redundancy HSRP-NAT  
no-payload  
!  
ip nat inside source static tcp 10.1.12.1  
443 192.168.2.251 443 redundancy HSRP-  
NAT no-payload  
end
```



대표 Switch

Core 1

```
en
conf t
no ip routing
hostname Core 1
!
enable secret cisco
no ip domain-lookup
no cdp run
!
line con 0
logg syn
exec-timeout 0 0
!
line vty 0 4
logg syn
exec-timeout 0 0
transport input all
password jungwoovty
login
end
```

```
conf t
spanning-tree mode rapid-pvst
!
int range e2/0 - 3
switchport trunk encapsulation dot1q
switchport mode trunk
End
```

```
conf t
!
int range e2/0 - 1
channel-group 1 mode active
int range e2/2 - 3
channel-group 2 mode active
End
```

```
conf t
int vlan 1
ip address 192.168.100.1 255.255.255.0
no shutdown
!
ip default-gateway 192.168.100.254
End
```



대표 Switch

Core 1

```
conf t
vlan 11
  name DHCP+FTP
vlan 12
  name Web+DNS
vlan 13
  name EMAIL
vlan 14
  name Intranet
vlan 15
  name VLAN_15
vlan 16
  name VLAN_16
vlan 17
  name VLAN_17
```

```
vlan 18
  name VLAN_18
vlan 19
  name VLAN_19
vlan 20
  name VLAN_20
End
```

```
conf t
int e0/0
  switchport trunk encapsulation dot1q
  switchport mode trunk
  spanning-tree portfast trunk
end
```

```
conf t
spanning-tree vlan 11-15 priority 4096
spanning-tree vlan 16-20 priority 8192
end
```




대표 Switch

DSW 11

```
en
conf t
no ip routing
hostname DSW101
!
enable secret cisco
no ip domain-lookup
no cdp run
!
line con 0
logg syn
exec-timeout 0 0
!
line vty 0 4
logg syn
exec-timeout 0 0
transport input all
password jungwoovty
login
end
```

```
conf t
spanning-tree mode rapid-pvst
!
int range e0/0 - 3
switchport trunk encapsulation dot1q
switchport mode trunk
int range e1/0 - 3
switchport trunk encapsulation dot1q
switchport mode trunk
int range e2/0 - 3
switchport trunk encapsulation dot1q
switchport mode trunk
End
conf t
!
int range e2/0 - 1
channel-group 1 mode active
int range e2/2 - 3
channel-group 2 mode active
end
```

```
conf t
int vlan 1
ip address 192.168.100.11 255.255.255.0
no shutdown
!
ip default-gateway 192.168.100.254
End
```



대표 Switch

DSW 11

```
conf t
vlan 11
  name DHCP+FTP
vlan 12
  name Web+DNS
vlan 13
  name EMAIL
vlan 14
  name Intranet
vlan 15
  name VLAN_15
vlan 16
  name VLAN_16
vlan 17
  name VLAN_17
vlan 18
  name VLAN_18
```

```
vlan 19
  name VLAN_19
vlan 20
  name VLAN_20
End

conf t
spanning-tree vlan 11-15 priority
12288
spanning-tree vlan 16-20 priority
16384
end
```



대표 Switch

ASW 101

```
en
conf t
no ip routing
hostname ASW101
!
enable secret cisco
no ip domain-lookup
no cdp run
!
line con 0
logg syn
exec-timeout 0 0
!
line vty 0 4
logg syn
exec-timeout 0 0
transport input all
password jungwoovty
login
end
```

```
conf t
spanning-tree mode rapid-pvst
!
int range e0/0 - 1
switchport trunk encapsulation dot1q
switchport mode trunk
End

conf t
int vlan 1
ip address 192.168.100.101
255.255.255.0
no shutdown
!
ip default-gateway 192.168.100.254
end
```

```
conf t
vlan 11
name DHCP+FTP
vlan 12
name Web+DNS
vlan 13
name EMAIL
vlan 14
name Intranet
vlan 15
name VLAN_15
vlan 16
name VLAN_16
vlan 17
name VLAN_17
vlan 18
name VLAN_18
vlan 19
name VLAN_19
vlan 20
name VLAN_20
end
```



대표 Switch

ASW 101

```
conf t
int e0/2
  switchport mode access
  switchport access vlan 11
  spanning-tree portfast
int e0/3
  switchport mode access
  switchport access vlan 12
  spanning-tree portfast
end
```



Jungwo University

감사합니다.

– 2024.05.10 –

김진환

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