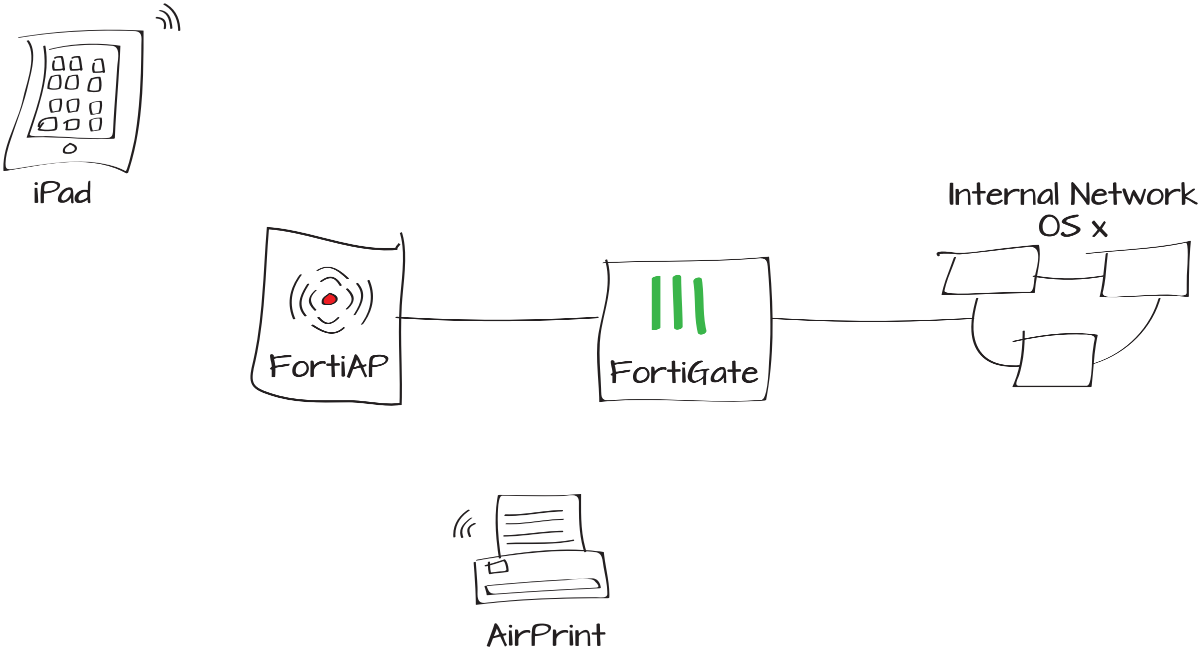
Using AirPrint with iOS and OS X and a FortiGate unit

This example sets up AirPrint services for use with an iOS device and OS X computers using Bonjour and multicast security policies.

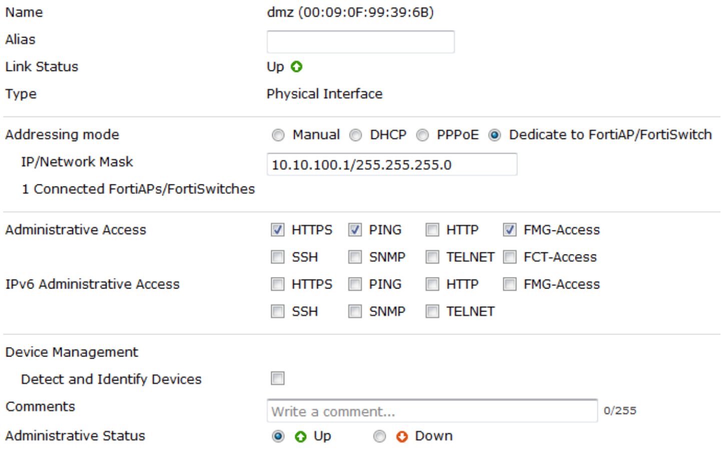
1. Configuring the FortiAP and SSIDs
2. Adding addresses for the wireless networks and printer
3. Adding service objects for printing
4. Adding multicast security policies
5. Adding inter-subnet security policies
6. Results



Configuring the FortiAP and SSIDs

Go to **System > Network > Interfaces**.

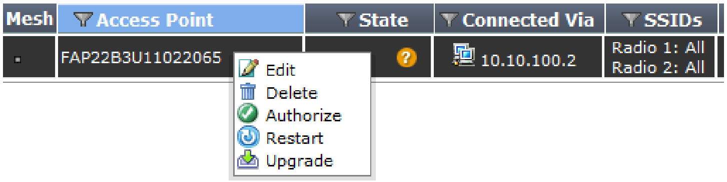
Set an internal interface as dedicated to the FortiAP unit.



Name	dmz (00:09:0F:99:39:6B)
Alias	
Link Status	Up
Type	Physical Interface
Addressing mode	○ Manual ○ DHCP ○ PPPoE ● Dedicate to FortiAP/FortiSwitch
IP/Network Mask	10.10.100.1/255.255.255.0
1 Connected FortiAPs/FortiSwitches	
Administrative Access	☑ HTTPS ☑ PING ☐ HTTP ☑ FMG-Access ☐ SSH ☐ SNMP ☐ TELNET ☐ FCT-Access
IPv6 Administrative Access	☐ HTTPS ☐ PING ☐ HTTP ☐ FMG-Access ☐ SSH ☐ SNMP ☐ TELNET
Device Management	
Detect and Identify Devices	☐
Comments	Write a comment... 0/255
Administrative Status	● Up ○ Down

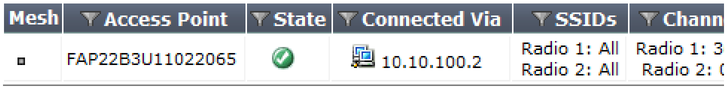
Connect the FortiAP unit to the FortiGate unit.

Go to **WiFi Controller > Managed Access Points > Managed FortiAP** and authorize the FortiAP.



Mesh	Access Point	State	Connected Via	SSIDs
▪	FAP22B3U11022065	?	10.10.100.2	Radio 1: All Radio 2: All

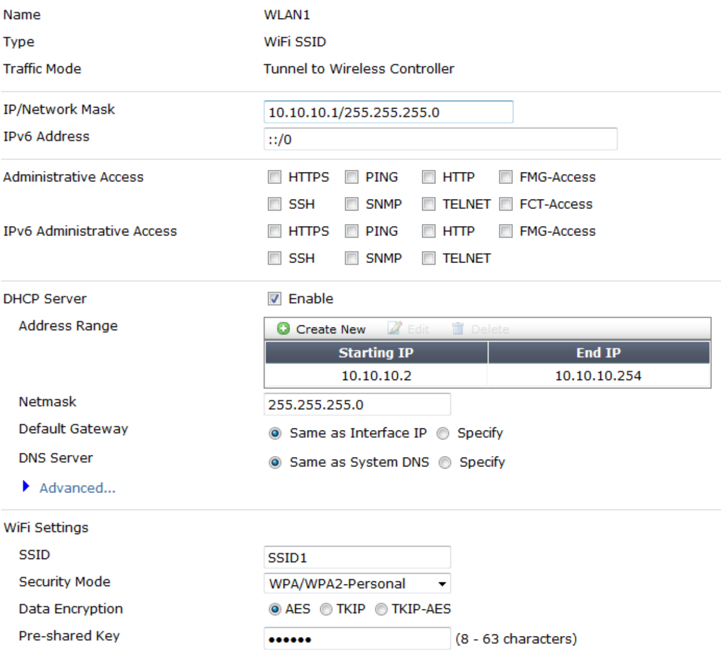
Once authorized, it will appear in the authorized list.



Mesh	Access Point	State	Connected Via	SSIDs	Chann
▪	FAP22B3U11022065	✓	10.10.100.2	Radio 1: All Radio 2: All	Radio 1: 3 Radio 2:

Go to **WiFi Controller > WiFi Network > SSID**.

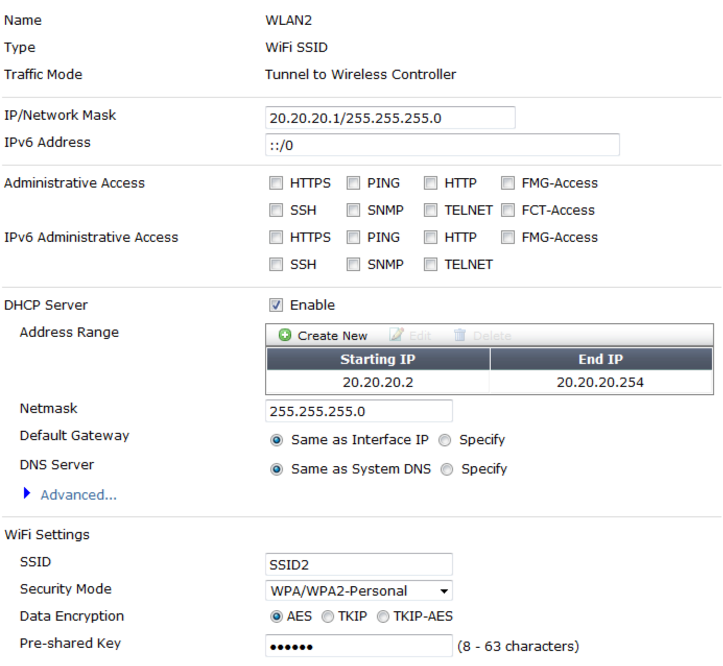
Create a WiFi SSID for the network for wireless users and enable **DHCP Server**.



Name	WLAN1
Type	WiFi SSID
Traffic Mode	Tunnel to Wireless Controller
IP/Network Mask	10.10.10.1/255.255.255.0
IPv6 Address	::/0
Administrative Access	☐ HTTPS ☐ PING ☐ HTTP ☐ FMG-Access ☐ SSH ☐ SNMP ☐ TELNET ☐ FCT-Access
IPv6 Administrative Access	☐ HTTPS ☐ PING ☐ HTTP ☐ FMG-Access ☐ SSH ☐ SNMP ☐ TELNET
DHCP Server	☑ Enable
Address Range	Create New Edit Delete
Netmask	255.255.255.0
Default Gateway	● Same as Interface IP ○ Specify
DNS Server	● Same as System DNS ○ Specify
Advanced...	
WiFi Settings	
SSID	SSID1
Security Mode	WPA/WPA2-Personal
Data Encryption	● AES ○ TKIP ○ TKIP-AES
Pre-shared Key	•••••• (8 - 63 characters)

Starting IP	End IP
10.10.10.2	10.10.10.254

Create an SSID for the network for the AirPrint printer and enable **DHCP Server**.



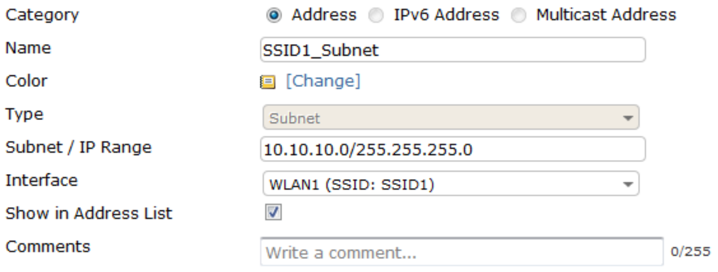
Name	WLAN2
Type	WiFi SSID
Traffic Mode	Tunnel to Wireless Controller
IP/Network Mask	20.20.20.1/255.255.255.0
IPv6 Address	::/0
Administrative Access	☐ HTTPS ☐ PING ☐ HTTP ☐ FMG-Access ☐ SSH ☐ SNMP ☐ TELNET ☐ FCT-Access
IPv6 Administrative Access	☐ HTTPS ☐ PING ☐ HTTP ☐ FMG-Access ☐ SSH ☐ SNMP ☐ TELNET
DHCP Server	☑ Enable
Address Range	Create New Edit Delete
Netmask	255.255.255.0
Default Gateway	● Same as Interface IP ○ Specify
DNS Server	● Same as System DNS ○ Specify
Advanced...	
WiFi Settings	
SSID	SSID2
Security Mode	WPA/WPA2-Personal
Data Encryption	● AES ○ TKIP ○ TKIP-AES
Pre-shared Key	•••••• (8 - 63 characters)

Starting IP	End IP
20.20.20.2	20.20.20.254

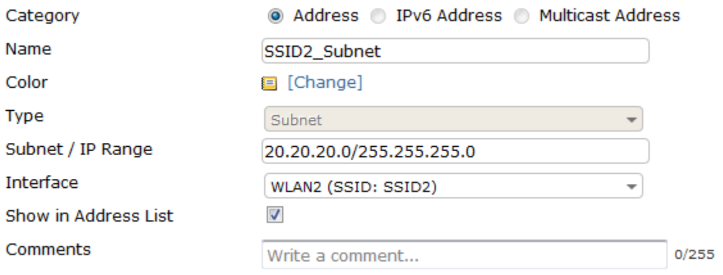
Adding addresses for the wireless networks and printer

Go to **Firewall Objects > Address > Addresses**.

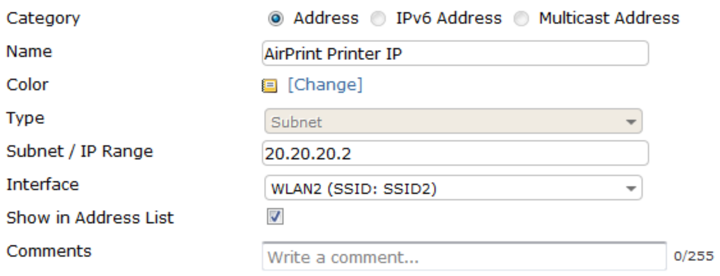
Create addresses for the SSID1, SSID2, and AirPrint printer.



Category	● Address ○ IPv6 Address ○ Multicast Address
Name	SSID1_Subnet
Color	[Change]
Type	Subnet
Subnet / IP Range	10.10.10.0/255.255.255.0
Interface	WLAN1 (SSID: SSID1)
Show in Address List	☑
Comments	Write a comment... 0/255

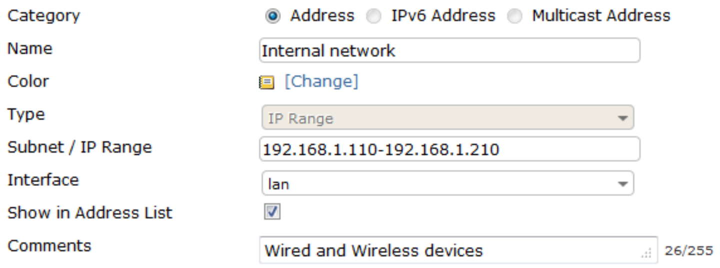


Category	● Address ○ IPv6 Address ○ Multicast Address
Name	SSID2_Subnet
Color	[Change]
Type	Subnet
Subnet / IP Range	20.20.20.0/255.255.255.0
Interface	WLAN2 (SSID: SSID2)
Show in Address List	☑
Comments	Write a comment... 0/255



Category	● Address ○ IPv6 Address ○ Multicast Address
Name	AirPrint Printer IP
Color	[Change]
Type	Subnet
Subnet / IP Range	20.20.20.2
Interface	WLAN2 (SSID: SSID2)
Show in Address List	☑
Comments	Write a comment... 0/255

Create an address for the internal network containing the OS X computers.

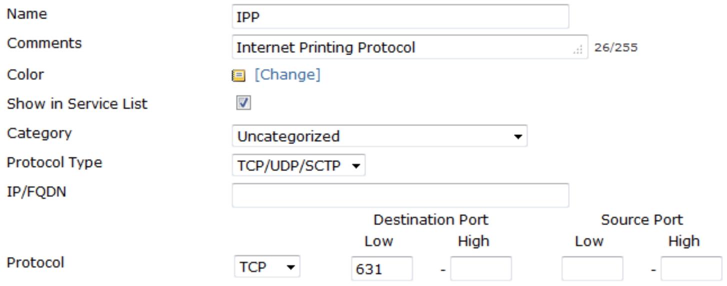


Category	● Address ○ IPv6 Address ○ Multicast Address
Name	Internal network
Color	[Change]
Type	IP Range
Subnet / IP Range	192.168.1.110-192.168.1.210
Interface	lan
Show in Address List	☑
Comments	Wired and Wireless devices 26/255

Adding service objects for printing

Go to **Firewall Objects > Service > Services**.

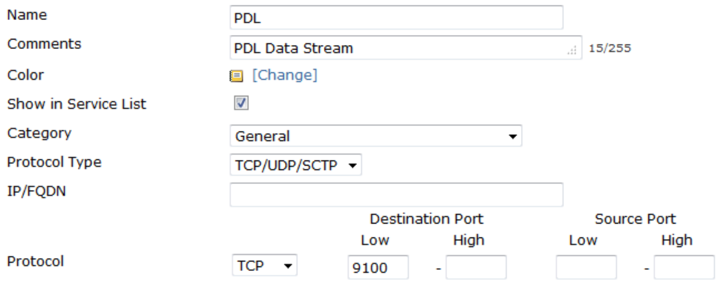
Create a new service for Internet Printing Protocol (IPP) for iOS devices.



Name	IPP
Comments	Internet Printing Protocol 26/255
Color	[Change]
Show in Service List	☑
Category	Uncategorized
Protocol Type	TCP/UDP/SCTP
IP/FQDN	

		Destination Port		Source Port	
		Low	High	Low	High
Protocol	TCP	631	-		-

Create a new service for PDL Data Stream for OS X computers.



Name	PDL
Comments	PDL Data Stream 15/255
Color	[Change]
Show in Service List	☑
Category	General
Protocol Type	TCP/UDP/SCTP
IP/FQDN	

		Destination Port		Source Port	
		Low	High	Low	High
Protocol	TCP	9100	-		-

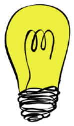
Adding multicast security policies

Go to **Policy > Policy > Multicast Policy**.

Create two policies to allow multicast traffic from WLAN1 and WLAN2 for iOS devices.

For the first policy, set **Incoming Interface** to WLAN1, **Source Address** to the SSID1 IP, **Outgoing Interface** to WLAN2, and **Destination Address** to **Bonjour**.

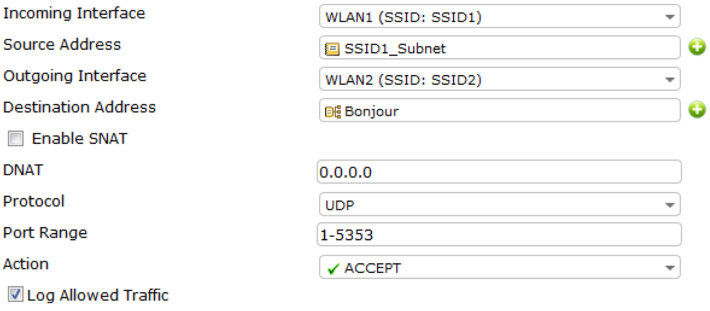
For the second policy, set **Incoming Interface** to WLAN2, **Source Address** to the SSID2 IP, **Outgoing Interface** to WLAN1, and **Destination Address** to **Bonjour**.



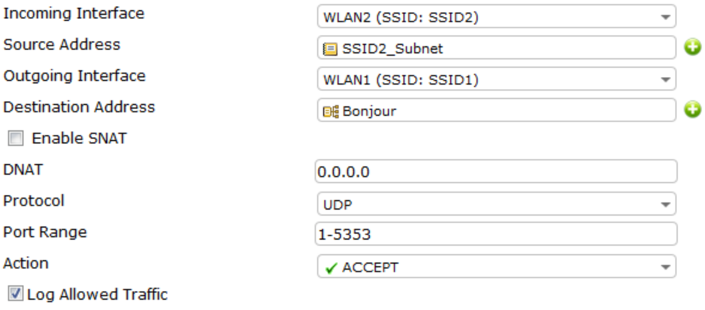
The Bonjour address allows the devices to find each other when they connect through the FortiGate unit.

Create two policies to allow multicast traffic from the LAN and WLAN2 for OS X computers.

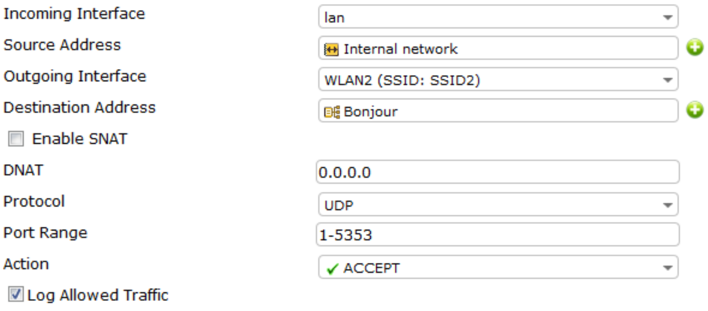
For the first policy, set **Incoming Interface** to LAN, **Source Address** to the Internal network, **Outgoing Interface** to WLAN2, and **Destination Address** to **Bonjour**.



Incoming Interface	WLAN1 (SSID: SSID1)
Source Address	SSID1_Subnet
Outgoing Interface	WLAN2 (SSID: SSID2)
Destination Address	Bonjour
☐ Enable SNAT	
DNAT	0.0.0.0
Protocol	UDP
Port Range	1-5353
Action	✓ ACCEPT
☑ Log Allowed Traffic	

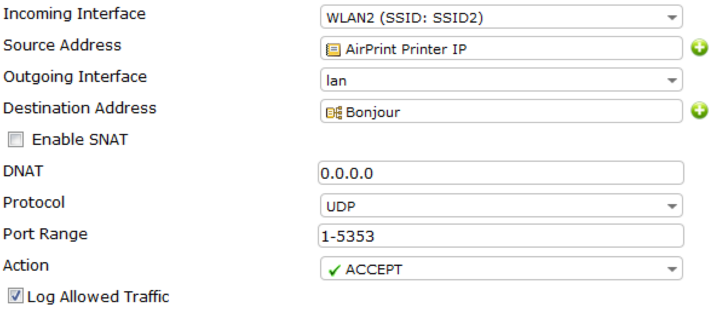


Incoming Interface	WLAN2 (SSID: SSID2)
Source Address	SSID2_Subnet
Outgoing Interface	WLAN1 (SSID: SSID1)
Destination Address	Bonjour
☐ Enable SNAT	
DNAT	0.0.0.0
Protocol	UDP
Port Range	1-5353
Action	✓ ACCEPT
☑ Log Allowed Traffic	



Incoming Interface	lan
Source Address	Internal network
Outgoing Interface	WLAN2 (SSID: SSID2)
Destination Address	Bonjour
☐ Enable SNAT	
DNAT	0.0.0.0
Protocol	UDP
Port Range	1-5353
Action	✓ ACCEPT
☑ Log Allowed Traffic	

For the second policy, set **Incoming Interface** to WLAN2, **Source Address** to the AirPrint, **Outgoing Interface** to LAN, and **Destination Address** to **Bonjour**.

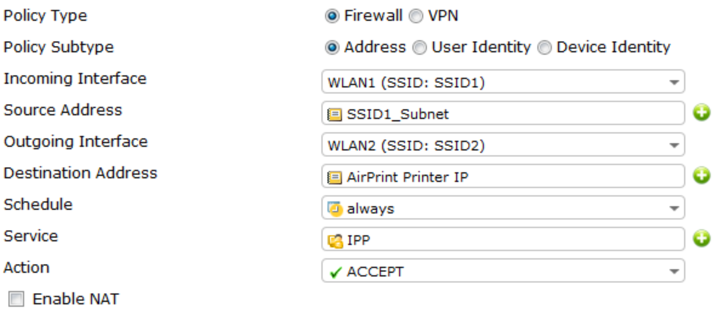


Incoming Interface: WLAN2 (SSID: SSID2)
Source Address: AirPrint Printer IP
Outgoing Interface: lan
Destination Address: Bonjour
☐ Enable SNAT
DNAT: 0.0.0.0
Protocol: UDP
Port Range: 1-5353
Action: ✓ ACCEPT
☑ Log Allowed Traffic

Adding inter-subnet security policies

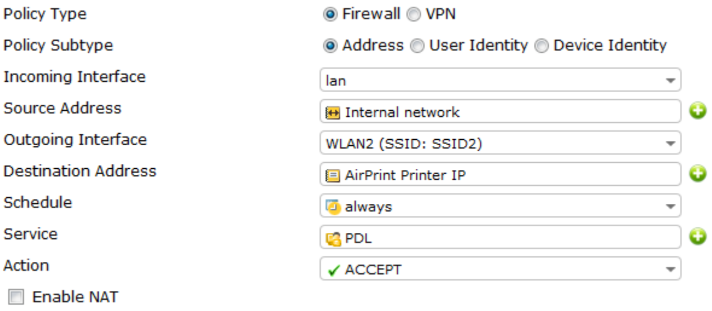
Go to **Policy > Policy > Policy**.

Create a policy allowing printing from wireless devices. Set **Incoming Interface** to WLAN1, **Source Address** to the SSID1 IP, **Outoing Interface** to WLAN2, **Destination Address** to the AirPrint, and **Service** to **IPP**.



Policy Type: ● Firewall ○ VPN
Policy Subtype: ● Address ○ User Identity ○ Device Identity
Incoming Interface: WLAN1 (SSID: SSID1)
Source Address: SSID1_Subnet
Outgoing Interface: WLAN2 (SSID: SSID2)
Destination Address: AirPrint Printer IP
Schedule: always
Service: IPP
Action: ✓ ACCEPT
☐ Enable NAT

Create a policy allowing printing from an OS X computer to the AirPrint printer. Set **Incoming Interface** to LAN, **Source Address** to the Internal network, **Outoing Interface** to WLAN2, **Destination Address** to the AirPrint, and **Service** to **IPP**.

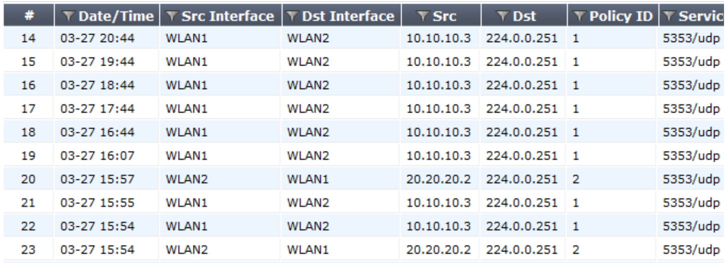


Policy Type: ● Firewall ○ VPN
Policy Subtype: ● Address ○ User Identity ○ Device Identity
Incoming Interface: lan
Source Address: Internal network
Outgoing Interface: WLAN2 (SSID: SSID2)
Destination Address: AirPrint Printer IP
Schedule: always
Service: PDL
Action: ✓ ACCEPT
☐ Enable NAT

Results

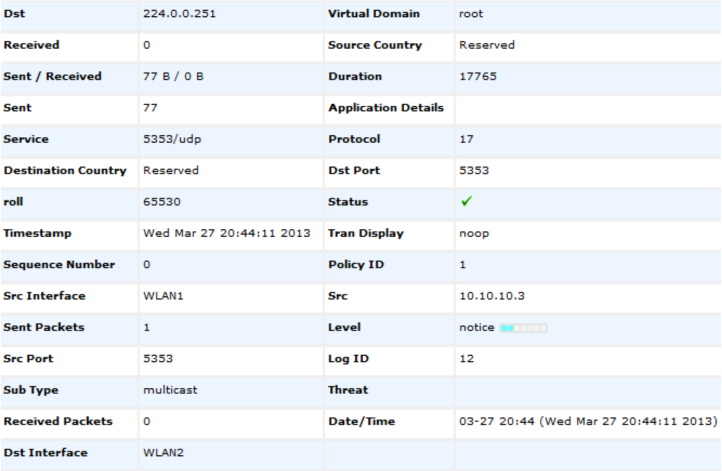
Print a document from an iOS device.

Go to **Log & Report > Traffic Log > Multicast Traffic** to see the printing traffic passing through the FortiGate unit.



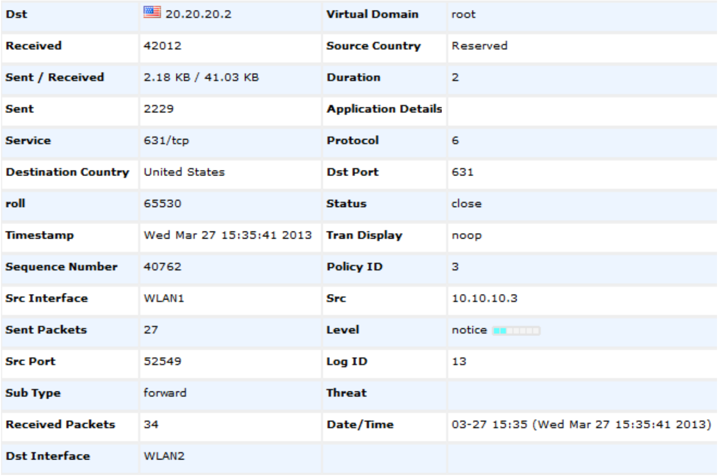
#	Date/Time	Src Interface	Dst Interface	Src	Dst	Policy ID	Servic
14	03-27 20:44	WLAN1	WLAN2	10.10.10.3	224.0.0.251	1	5353/udp
15	03-27 19:44	WLAN1	WLAN2	10.10.10.3	224.0.0.251	1	5353/udp
16	03-27 18:44	WLAN1	WLAN2	10.10.10.3	224.0.0.251	1	5353/udp
17	03-27 17:44	WLAN1	WLAN2	10.10.10.3	224.0.0.251	1	5353/udp
18	03-27 16:44	WLAN1	WLAN2	10.10.10.3	224.0.0.251	1	5353/udp
19	03-27 16:07	WLAN1	WLAN2	10.10.10.3	224.0.0.251	1	5353/udp
20	03-27 15:57	WLAN2	WLAN1	20.20.20.2	224.0.0.251	2	5353/udp
21	03-27 15:55	WLAN1	WLAN2	10.10.10.3	224.0.0.251	1	5353/udp
22	03-27 15:54	WLAN1	WLAN2	10.10.10.3	224.0.0.251	1	5353/udp
23	03-27 15:54	WLAN2	WLAN1	20.20.20.2	224.0.0.251	2	5353/udp

Select an entry to see more information.



Dst	224.0.0.251	**Virtual Domain**	root
Received	0	**Source Country**	Reserved
Sent / Received	77 B / 0 B	**Duration**	17765
Sent	77	**Application Details**	
Service	5353/udp	**Protocol**	17
Destination Country	Reserved	**Dst Port**	5353
roll	65530	**Status**	✓
Timestamp	Wed Mar 27 20:44:11 2013	**Tran Display**	noop
Sequence Number	0	**Policy ID**	1
Src Interface	WLAN1	**Src**	10.10.10.3
Sent Packets	1	**Level**	notice
Src Port	5353	**Log ID**	12
Sub Type	multicast	**Threat**	
Received Packets	0	**Date/Time**	03-27 20:44 (Wed Mar 27 20:44:11 2013)
Dst Interface	WLAN2		

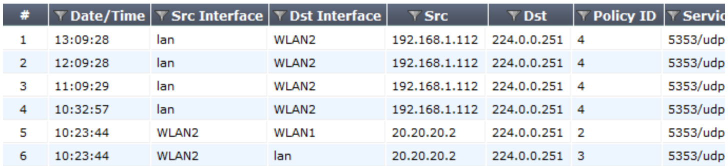
Go to **Log & Report > Traffic Log > Forward Traffic** and verify the entry with the IPP service.



Dst	20.20.20.2	**Virtual Domain**	root
Received	42012	**Source Country**	Reserved
Sent / Received	2.18 KB / 41.03 KB	**Duration**	2
Sent	2229	**Application Details**	
Service	631/tcp	**Protocol**	6
Destination Country	United States	**Dst Port**	631
roll	65530	**Status**	close
Timestamp	Wed Mar 27 15:35:41 2013	**Tran Display**	noop
Sequence Number	40762	**Policy ID**	3
Src Interface	WLAN1	**Src**	10.10.10.3
Sent Packets	27	**Level**	notice
Src Port	52549	**Log ID**	13
Sub Type	forward	**Threat**	
Received Packets	34	**Date/Time**	03-27 15:35 (Wed Mar 27 15:35:41 2013)
Dst Interface	WLAN2		

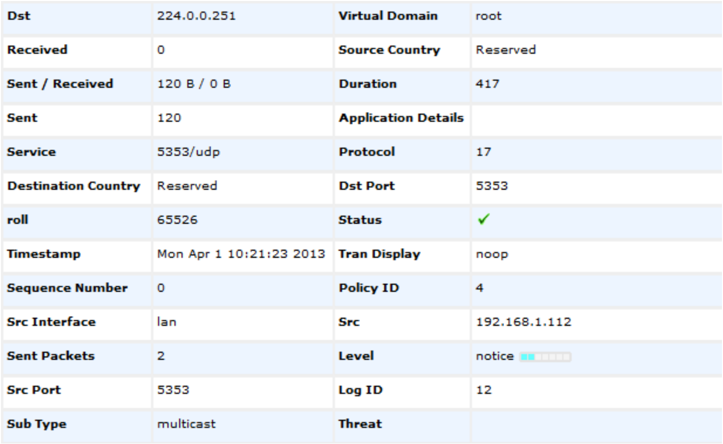
Print a document from an OS X computer.

Go to **Log & Report > Traffic Log > Multicast Traffic** to see the printing traffic passing through the FortiGate unit.



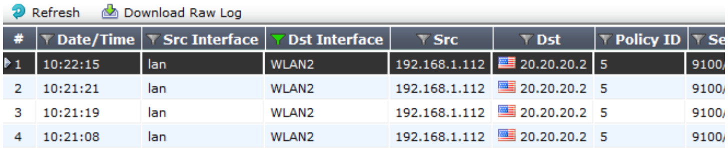
#	Date/Time	Src Interface	Dst Interface	Src	Dst	Policy ID	Servic
1	13:09:28	lan	WLAN2	192.168.1.112	224.0.0.251	4	5353/udp
2	12:09:28	lan	WLAN2	192.168.1.112	224.0.0.251	4	5353/udp
3	11:09:29	lan	WLAN2	192.168.1.112	224.0.0.251	4	5353/udp
4	10:32:57	lan	WLAN2	192.168.1.112	224.0.0.251	4	5353/udp
5	10:23:44	WLAN2	WLAN1	20.20.20.2	224.0.0.251	2	5353/udp
6	10:23:44	WLAN2	lan	20.20.20.2	224.0.0.251	3	5353/udp

Select an entry to see more information.



Dst	224.0.0.251	**Virtual Domain**	root
Received	0	**Source Country**	Reserved
Sent / Received	120 B / 0 B	**Duration**	417
Sent	120	**Application Details**	
Service	5353/udp	**Protocol**	17
Destination Country	Reserved	**Dst Port**	5353
roll	65526	**Status**	✓
Timestamp	Mon Apr 1 10:21:23 2013	**Tran Display**	noop
Sequence Number	0	**Policy ID**	4
Src Interface	lan	**Src**	192.168.1.112
Sent Packets	2	**Level**	notice
Src Port	5353	**Log ID**	12
Sub Type	multicast	**Threat**	

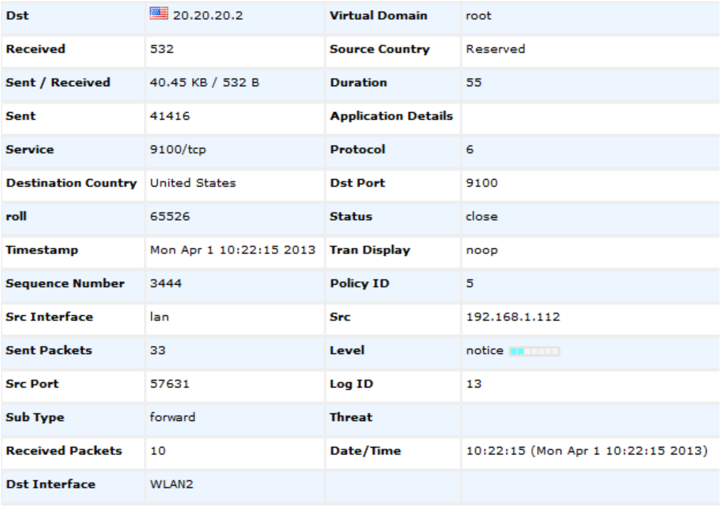
Go to **Log & Report > Traffic Log > Forward Traffic** and filter the destination interface for WLAN2 traffic.



Refresh   Download Raw Log

#	Date/Time	Src Interface	Dst Interface	Src	Dst	Policy ID	Se
1	10:22:15	lan	WLAN2	192.168.1.112	20.20.20.2	5	9100/
2	10:21:21	lan	WLAN2	192.168.1.112	20.20.20.2	5	9100/
3	10:21:19	lan	WLAN2	192.168.1.112	20.20.20.2	5	9100/
4	10:21:08	lan	WLAN2	192.168.1.112	20.20.20.2	5	9100/

Select an entry to see more information.



Dst	20.20.20.2	**Virtual Domain**	root
Received	532	**Source Country**	Reserved
Sent / Received	40.45 KB / 532 B	**Duration**	55
Sent	41416	**Application Details**	
Service	9100/tcp	**Protocol**	6
Destination Country	United States	**Dst Port**	9100
roll	65526	**Status**	close
Timestamp	Mon Apr 1 10:22:15 2013	**Tran Display**	noop
Sequence Number	3444	**Policy ID**	5
Src Interface	lan	**Src**	192.168.1.112
Sent Packets	33	**Level**	notice
Src Port	57631	**Log ID**	13
Sub Type	forward	**Threat**	
Received Packets	10	**Date/Time**	10:22:15 (Mon Apr 1 10:22:15 2013)
Dst Interface	WLAN2		