

WIRELESS CONTROLLER USER MANUAL

DWC-1000



VER. 1.01

BUSINESS WIRELESS SOLUTION

User Manual

Wireless Controller

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User Manual DWC-1000 Wireless Controller Version 1.01

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Chapter 1. Introduction

D-Link Wireless Controller (DWC), DWC-1000, is a full-featured wireless LAN controller designing for small network environment. The centralized control function contains various access point management functions, such as fast-roaming, inter-subnet roaming, automatic channel and power adjustment, self-healing etc. The advanced wireless security function, including rouge AP detection, captive portal, wireless intrusion detection system (WIDS), offers a strong wireless network protection avoiding attacks from hackers. After license upgrade optimal network security is provided via features such as virtual private network (VPN) tunnels, IP Security (IPsec), Point-to-Point Tunneling Protocol (PPTP), Layer 2 Tunneling Protocol (L2TP), and Secure Sockets Layer (SSL). Empower your road warriors with clientless remote access anywhere and anytime using SSL VPN tunnels.

There are two types of licenses available to activate increased functionality for the DWC. These licenses are not activated by default.

- VPN license upgrade enables the following features: ISP Connection types (PPPoE, PPTP, L2TP, NAT/Transparent mode), Option2/DMZ port, IP Aliasing, Dynamic Routing (RIP), VPN (PPTP client/server, L2TP client /server, SSLVPN, OpenVPN), Intel AMT, Dynamic DNS, Website Filter, Application Rules, Firewall Rules, UPNP, IGMP proxy, and ALG/SMTP-ALG
- AP license upgrades the number of APs controller can manage. You can upgrade upto 3 AP licenses. By default DWC-1000 can manage upto 6 AP's. You increase the number by 6 upon each AP license.

1.1 About this User Manual

This document is a high level manual to allow new D-Link Wireless Controller users to configure connectivity, WLAN configuration, setup VPN tunnels, establish firewall rules and AP management and perform general administrative tasks. Typical deployment and use case scenarios are described in each section. For more detailed setup instructions and explanations of each configuration parameter, refer to the online help that can be accessed from each page in the controller GUI.

Solution For this user manual all screenshots are taken with an activated VPN license which enables VPN / Firewall features.

1.2 Typographical Conventions

The following is a list of the various terms, followed by an example of how that term is represented in this document:

• Product Name: D-Link Wireless Controller

o Model number: DWC-1000

- GUI Menu Path/GUI Navigation *Monitoring > Controller Status*
- Important note 🖎

Chapter 2. Configuring Your Network

To enable management access for the browser based web GUI access or SNMP manager, you must connect the controller to the network. The default IP address/subnet mask of the controller management interface is **192.168.10.1** / **255.255.255.0** and DHCP server on the LAN is disabled by default on the controller. You must connect the controller to a **192.168.10.0** network.

After you configure network information, such as the IP address and subnet mask, and the controller is physically and logically connected to the network, you can manage and monitor the controller remotely through Web browser, or an SNMP-based network management system. Once the initial setup is complete, the DWC-1000 can be managed through wired interface connected to controller.

Access the controller's GUI for management by using any web browser, such as Microsoft Internet Explorer or Mozilla Firefox.

Go to **http://192.168.10.1** (default IP address) to display the controller's management login screen.

Default login credentials for the management GUI:

- Username: admin
- Password: admin
- If the controller's LAN IP address was changed, use that IP address in the navigation bar of the browser to access the controller's management UI.

2.1 LAN Configuration

Setup > Network Settings > LAN Setup Configuration

By default, in the controller the Dynamic Host Configuration Protocol (DHCP) mode is set to "None". The DHCP mode can be set as a DHCP server or DHCP relay. When DHCP mode is set as DHCP server, the controller functions as a DHCP server for assigning IP address leases to hosts on the WLAN or LAN. With DHCP, PCs and other LAN devices can be assigned IP addresses, the default gateway, as well as addresses for DNS servers, Windows Internet Name Service (WINS) servers. The PCs in the LAN are assigned IP addresses from a pool of addresses specified in this procedure. Each pool address is tested before it is assigned to avoid duplicate addresses on the LAN.

For most applications the default DHCP and TCP/IP settings are satisfactory. If you want another PC on your network to be the DHCP server or if you are manually configuring the network settings of all of your PCs, set the DHCP mode to 'none'. DHCP relay can be used to forward DHCP lease information from another LAN device that is the network's DHCP server; this is particularly useful for wireless clients.

Instead of using a DNS server, you can use a Windows Internet Naming Service (WINS) server. A WINS server is the equivalent of a DNS server but uses the NetBIOS protocol to resolve hostnames. The controller includes the WINS server IP address in the DHCP configuration when acknowledging a DHCP request from a DHCP client.

You can also enable DNS proxy for the LAN. When this is enabled the controller then as a proxy for all DNS requests and communicates with the ISP's DNS servers. When disabled all DHCP clients receive the DNS IP addresses of the ISP.

To configure LAN Connectivity, please follow the steps below:

1. In the LAN Setup page, enter the following information for your controller:

IP address: (factory default: 192.168.10.1).

If you change the IP address and click Save Settings, the GUI will not respond. Open a new connection to the new IP address and log in again. Be sure the LAN host (the machine used to manage the controller) has obtained IP address from newly assigned pool (or has a static IP address in the controller's LAN subnet) before accessing the controller via changed IP address.

Subnet mask: (factory default: 255.255.255.0).

2. In the DHCP section, select the DHCP mode:

None: the controller's DHCP server is disabled for the LAN

DHCP Server. With this option the controller assigns an IP address within the specified range plus additional specified information to any LAN device that requests DHCP served addresses.

If DHCP is being enabled, enter the following DHCP server parameters:

DHCP Relay: With this option enabled, DHCP clients on the LAN can receive IP address leases and corresponding information from a DHCP server on a different subnet. Specify the Relay Gateway, and when LAN clients make a DHCP request it will be passed along to the server accessible via the Relay Gateway IP address.

Starting and Ending IP Addresses: Enter the first and last continuous addresses in the IP address pool. Any new DHCP client joining the LAN is assigned an IP address in this range. The default starting address is 192.168.10.100. The default ending address is 192.168.10.254. These addresses should be in the same IP address subnet as the controller's LAN IP address. You may wish to save part of the subnet range for devices with statically assigned IP addresses in the LAN.

Default Gateway (Optional): Enter the IP address of the controller which you want to make it as a default other than DWC-1000

Primary and Secondary DNS servers: If configured domain name system (DNS) servers are available on the LAN enter their IP addresses here.

Domain Name: Enter domain name

WINS Server (optional): Enter the IP address for the WINS server or, if present in your network, the Windows NetBios server.

Lease Time: Enter the time, in hours, for which IP addresses are leased to clients.

Enable DNS Proxy: To enable the controller to act as a proxy for all DNS requests and communicate with the ISP's DNS servers, click the checkbox.

Relay Gateway: Enter the gateway address. This is the only configuration parameter required in this section when DHCP Relay is selected as its DHCP mode

3. Click Save Settings to apply all changes.

Figure 1: Setup page for LAN TCP/IP settings (DHCP server)

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	LAN SETUP			LOGOUT
AP Management	The LAN Configuration p Server which runs on it	page allows you to configure	e the LAN interface of the i	router including the DHCP
WLAN Visualization 🔸	Save Settings	Don't Save Setting	-	
Internet Settings	Save Settings	Don't Save Setting		
Network Settings D	LAN IP Address Setu	p		
LAN QoS	IP Address:	192	2.168.15.1	
VPN Settings	Subnet Mask:	25	5.255.255.0	
VLAN Settings	DHCP			
DMZ Setup	DHCP Mode:	DH	ICP Server	
USB Settings	Starting TD Address		2 168 15 100	
		IS. 10	2.100.15.150	
	Ending IP Address	19.	2.168.15.152	
	Default Gateway (Optional):		
	Primary DNS Serve	er:		
	Secondary DNS Se	rver:		
	Domain Name:	DL	ink	
	WINS Server:			
	Lease Time:	24		
	Relay Gateway:			

DMZ Setup	DHCP	,				
USB Settings	DH	CP Mode:	DHCF	Relay 👻		
	Sta	rting IP Address:	192.16	8.10.200		
	Ending IP Address:		192.10	192.168.10.254		
	Default Gateway (Optional):					
	Prir	mary DNS Server:				
	Sec	condary DNS Server:				
	Dor	main Name:	DLink			
	wI	NS Server:				
	Lea	ise Time:	24			
	Rel	ay Gateway:	192.1	68.10.5		
	DNS H	lost Name Mapping				
	#	Host Name		:	IP Address	
	1	Adminstration		192.1	68.10.30	
	2					

Figure 2: Setup page for LAN TCP/IP settings (DHCP Relay)

When DHCP relay is eanabled, DHCP clients on the LAN can receive IP address leases and corresponding information from a DHCP server on a different subnet. Specify the Relay Gateway, and when LAN clients make a DHCP request it will be passed along to the server accessible via the Relay Gateway IP address.

2.1.1 LAN DHCP Reserved IPs

Setup > Network Settings > LAN DHCP Reserved IPs

The controller DHCP server can assign TCP/IP configurations to computers in the LAN explicitly by adding client's network interface hardware address and the IP address to be assigned to that client in DHCP server's database. Whenever DHCP server receives a request from client, hardware address of that client is compared with the hardware address list present in the database, if an IP address is already assigned to that computer or device in the database , the customized IP address is configured otherwise an IP address is assigned to the client automatically from the DHCP pool.

IP Addresses: The LAN IP address of a host that is reserved by the DHCP server.

MAC Addresses: The MAC address that will be assigned the reserved IP address when it is on the LAN.

The actions that can be taken on list of reserved IP addresses are:

Select: Selects all the reserved IP addresses in the list.

Edit: Opens the LAN DHCP Reserved IP Configuration page to edit the selected binding rule.

Delete: Deletes the selected IP address reservation(s)

Add: Opens the LAN DHCP Reserved IP Configuration page to add a new binding rule.

Figure 3: LAN DHCP Reserved IPs

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS	
Wizard 🕨		Operation	succeeded		
WLAN Global Settings		(LAN)		LOGOUT	
AP Management 🔹 🕨	DHOP RESERVED IPS	DHCP RESERVED IPS (LAN)			
WLAN Visualization 🔸	This page allows user to	configure the reserved IP Ack	dresses for the DHCP Server	configuration.	
Internet Settings	DHCP Reserved IPs (L	AN)			
Network Settings \square	□ IP	Address	MAC A	ddress	
LAN QoS 🕨	192	168.10.233	00:00:00:	00:00:67	
VPN Settings		Edit De	hb4		

2.1.2 LAN DHCP Leased Clients

Setup > Network Settings > LAN DHCP Leased Clients

This page provides the list of clients connect to LAN DHCP server.

Figure 4: LAN DHCP Leased Clients

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings		T		
AP Management 🔹 🕨	DHCP LEASED CLIEN	15		LOGOUT
WLAN Visualization 🔸	This table displays the list has given leases.	t of DHCP clients connected	to the LAN DHCP Server and	to whom DHCP Server
Internet Settings 🔹 🕨				
Network Settings	DHCP Leased Clients ((LAN)		
	IP Add	Iress	MAC Add	iress
	192.168.	10.233	00:00:00	0:00:67
VPN Settings 🔹 🕨				

IP Addresses: The LAN IP address of a host that matches the reserved IP list. **MAC Addresses**: The MAC address of a LAN host that has a configured IP address reservation.

2.1.3 LAN Configuration in an IPv6 Network

Advanced > IPv6 > IPv6 LAN > IPv6 LAN Config

In IPv6 mode, the LAN DHCP server is enabled by default (similar to IPv4 mode). The DHCPv6 server will serve IPv6 addresses from configured address pools with the IPv6 Prefix Length assigned to the LAN.

IPv4 / IPv6 mode must be enabled in the Advanced > IPv6 > Routing mode to enable IPv6 configuration options.

LAN IP Address Setup

The default IPv6 LAN address for the router is **fec0::1**. You can change this 128 bit IPv6 address based on your network requirements. The other field that defines the LAN settings for the router is the prefix length. The IPv6 network (subnet) is identified by the initial bits of the address called the prefix. By default this is **64** bits long. All hosts in the network have common initial bits for their IPv6 address; the number of common initial bits in the network's addresses is set by the prefix length field.

Figure	5:	IPv6	LAN	and	DHCPv6	configuration
--------	----	------	-----	-----	--------	---------------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	IPV6 LAN CONFIG			LOGOUT
AP Profile	This page allows user to	IPv6 related LAN configurat	ions.	
SSIDs	Save Settings	Don't Save Setting	gs	
WIDS Security	I AN TP Address Setu	n		
Captive Portal		P		
Client	IPv6 Address:	4#	4::1	
Application Rules	IPv6 Prefix Length	: 64		
Website Filter 🕨 🕨	DHCPv6			
Firewall Settings	DHCP Status:	En	able DHCPv6 Server 👻	
IPv6 D	DHCP Mode:	St	ateful 👻	
Advanced Network	Domain Name:	dlir	nk.com	
Routing >	Server Preference	25	5	
Certificates	DNS Servers:	Us	e below 👻	
Users 🕨	Brimany DNS Song	50	091	
IP/MAC Binding	Primary Dis Serve	30	301	
Radius Settings	Secondary DNS Se	rver: 98	75::1	
Switch Settings	Lease/Rebind Time	e: 86	400 (Seconds)	
Intel [®] AMT	Prefix Delegation			
	List of IPv6 Address	Pools		
	S	tart Address	End	Address
		4ff4::2	4	ff4::55

If you change the IP address and click Save Settings, the GUI will not respond. Open a new connection to the new IP address and log in again. Be sure the LAN host (the machine used to manage the router) has obtained IP address from newly assigned pool (or has a static IP address in the router's LAN subnet) before accessing the router via changed IP address.

DHCP v6

As with an IPv4 LAN network, the router has a DHCPv6 server. If enabled, the router assigns an IP address within the specified range plus additional specified information to any LAN PC that requests DHCP served addresses.

The following settings are used to configure the DHCPv6 server:

DHCP Status: This allow to Enable/Disable DHCPv6 server.

DHCP Mode: The IPv6 DHCP server is either stateless or stateful. If stateless is selected an external IPv6 DHCP server is not required as the IPv6 LAN hosts are auto-configured by this controller. In this case the controller advertisement daemon (RADVD) must be configured on this device and ICMPv6 controller discovery messages are used by the host for auto-configuration. There are no managed addresses to serve the LAN nodes. If stateful is selected the IPv6 LAN host will rely on an external DHCPv6 server to provide required configuration settings

The Domain Name of the DHCPv6 server is an optional setting

Server Preference: To indicate the preference level of this DHCP server. DHCP advertise messages with the highest server preference value to a LAN host are preferred over other DHCP server advertise messages. The default is 255.

DNS server: The details can be manually entered here (primary/secondary options. An alternative is to allow the LAN DHCP client to receive the DNS server details from the ISP directly. By selecting Use DNS proxy, this router acts as a proxy for all DNS requests and communicates with the ISP's DNS servers (a Option configuration parameter).

Primary and Secondary DNS servers : If there are configured domain name system (DNS) servers available on the LAN enter the IP addresses here.

Lease/Rebind time: It sets the duration of the DHCPv6 lease from this router to the LAN client.

IPv6 Address Pools

This feature allows you to define the IPv6 delegation prefix for a range of IP addresses to be served by the gateway's DHCPv6 server. Using a delegation prefix you can automate the process of informing other networking equipment on the LAN of DHCP information specific for the assigned prefix.

Prefix Delegation

The following settings are used to configure the Prefix Delegation:

Prefix Delegation: Select this option to enable prefix delegation in DHCPv6 server. This option can be selected only in Stateless Address Auto Configuration mode of DHCPv6 server.

Prefix Address: IPv6 prefix address in the DHCPv6 server prefix pool

Prefix Length: Length prefix address

2.1.4 DHCPv6 Leased Clients

Advanced > IPv6 > IPv6 LAN > DHCPv6 Leased Clients

This page provides the list of DHCPv6 clients connected to the LAN DHCPv6 Server and to whom DHCPv6 Server has given leases.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	DHCPV6 LEASED CLIE	NTS		LOGOUT
AP Profile				
SSIDs	This table displays the DHCPv6 Server has give	list of DHCPv6 clients conne n leases.	cted to the LAN DHCPv6 Se	rver and to whom
WIDS Security	DHCPv6 Leased Cliev	ats(LAN)		
Captive Portal 🛛 🕨	IP Address	D	UID	IAID
Client	5005::8/64	00:01:00:01:16:59:1	.8:9a:00:0f:1f:8d:f0:70	529395824
Application Rules				
Website Filter				
Firewall Settings 🛛 🕨				
IPv6 D				
Advanced Network 🕨				

Figure 6: DHCPv6 Leased Clients

IP Addresses: This is the DHCP server IP address.

DUID: Each DHCP client and server has a DUID. DHCP servers use DUIDs to identify clients for the selection of configuration parameters and in the association

of IAs with clients. DHCP clients use DUIDs to identify a server in messages where a server needs to be identified.

IAID: An identifier for an IA, chosen by the client. Each IA has an IAID, which is chosen to be unique among all IAIDs for IAs belonging to that client.: This is Dhcp server IP address.

2.1.5 Configuring IPv6 Router Advertisements

Router Advertisements are analogous to IPv4 DHCP assignments for LAN clients, in that the router will assign an IP address and supporting network information to devices that are configured to accept such details. Router Advertisement is required in an IPv6 network is required for stateless auto configuration of the IPv6 LAN. By configuring the Router Advertisement Daemon on this router, the DWC-1000 will listen on the LAN for router solicitations and respond to these LAN hosts with router advisements.

RADVD

Advanced > IPv6 > IPv6 LAN > Router Advertisement

To support stateless IPv6 auto configuration on the LAN, set the RADVD status to Enable. The following settings are used to configure RADVD:

RADVD Status: You can enable the RADVD process here to allow stateless auto configuration of the IPv6 LAN network.

Advertise Mode: Select Unsolicited Multicast to send router advertisements (RA's) to all interfaces in the multicast group. To restrict RA's to well known IPv6 addresses on the LAN, and thereby reduce overall network traffic, select Unicast only.

Advertise Interval: When advertisements are unsolicited multicast packets, this interval sets the maximum time between advertisements from the interface. The actual duration between advertisements is a random value between one third of this field and this field. The default is 30 seconds.

RA Flags: The router advertisements (RA's) can be sent with one or both of these flags. Chose Managed to use the administered /stateful protocol for address auto configuration. If the Other flag is selected the host uses administered/stateful protocol for non-address auto configuration.

Router Preference: this low/medium/high parameter determines the preference associated with the RADVD process of the router. This is useful if there are other RADVD enabled devices on the LAN as it helps avoid conflicts for IPv6 clients.

MTU: The router advertisement will set this maximum transmission unit (MTU) value for all nodes in the LAN that are autoconfigured by the router. The default is 1500.

Router Lifetime: This value is present in RA's and indicates the usefulness of this router as a default router for the interface. The default is 3600 seconds. Upon expiration of this value, a new RADVD exchange must take place between the host and this router.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨	Please Set IP M	ode to IPv4/IPv6 in Rou	iting Mode Page to c	onfigure this page.
Peer Controllers	PADVD			
AP Profile	NADVD	-		LOGOUT
SSIDs	This page allows user to co	onfigure Router Advertisemer	nt Daemon (RADVD) relate	d configurations.
WIDS Security	Save Settings	Don't Save Setting:	S	
Captive Portal	Router Advertisemen	t Daemon (RADVD)		
Client	RADVD Status:	Dis	able 👻	
Application Rules 🕨 🕨	Advertise Mode:	Un	solicited Multicast 👻	
Website Filter 🕨 🕨	Advertise Interval:	30		
Firewall Settings	RA Flags			
IPv6 D	Managed			
Advanced Network 🕨 🕨	Other			
Routing ►	Router Proference:	Hig	b _	
Certificates	Kouter Preference.	1119		
Users 🕨	MIU:	150		
IP/MAC Binding	Router Lifetime:	360	0 (Seconds)	

Figure 7: Configuring the Router Advertisement Daemon

Advertisement Prefixes

Advanced > IPv6 > IPv6 LAN > Advertisement Prefixes

The router advertisements configured with advertisement prefixes allow this router to inform hosts how to perform stateless address auto configuration. Router advertisements contain a list of subnet prefixes that allow the router to determine neighbors and whether the host is on the same link as the router.

The following prefix options are available for the router advertisements:

IPv6 Prefix Type: To ensure hosts support IPv6 to IPv4 tunnel select the 6to4 prefix type. Selecting Global/Local/ISATAP will allow the nodes to support all other IPv6 routing options

SLA ID: The SLA ID (Site-Level Aggregation Identifier) is available when 6to4 Prefixes are selected. This should be the interface ID of the router's LAN interface used for router advertisements. **IPv6 Prefix**: When using Global/Local/ISATAP prefixes, this field is used to define the IPv6 network advertised by this router.

IPv6 Prefix Length: This value indicates the number contiguous, higher order bits of the IPv6 address that define up the network portion of the address. Typically this is 64.

Prefix Lifetime: This defines the duration (in seconds) that the requesting node is allowed to use the advertised prefix. It is analogous to DHCP lease time in an IPv4 network.

Figure 8: IPv6 Advertisement Prefix settings

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Application Rules 🔹 🕨				
Website Filter 🔹 🕨	ADVERTISEMENT PRE	FIXES		LOGOUT
Firewall Settings 🛛 🕨	Description			
Wireless Settings 🛛 🕨	Save Settings	Don't Save Setting	8	
Advanced Network 🔹 🕨				
Routing >	Advertise Prefixes Co	nfiguration		
Certificates	IPv6 Prefix Type:	6tc	•4	
Users 🕨	SLA ID:			
IP/MAC Binding	IPv6 Prefix:			
IPv6 D	IPv6 Prefix Length			
Power Saving	Prefix Lifetime:		(Seconds)	

2.2 LAN QoS

2.2.1 Port Queue Scheduling

Setup > LAN QoS > Port Queue Scheduling

This page allows to select the queueing scheduling algorithm.

Queueing scheduling algorithm: The scheduling algorithm for the LAN controller can be configured here. The supported algorithms are strict and weighted round

robin only. The device will be programmed to handle the traffic using the algorithm configured here

Figure 9: Port Queue Scheduling

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS	
Wizard 🕨					
WLAN Global Settings	PORT QUEUE SCHEDU	ULING		LOGOUT	
AP Management 🔹 🕨					
WLAN Visualization 🕨	Save Settings Don't Save Settings				
Internet Settings	Port Queue Scheduling	I			
Network Settings	Queue Scheduling A	kaorithm:	rict		
LAN QoS D					
VPN Settings					
VLAN Settings 🔹 🕨					

2.2.2 Port Queue Status

Setup > LAN QoS > Port Queue Status

This page shows the current queue management algorithm that is used in the LAN controller

Queueing Management algorithm: Display the current queue management algorithm that is used in the LAN controller

Figure 10: Port Queue Status

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	PORT QUEUE STATUS			LOGOUT
AP Management 🔹 🕨				
WLAN Visualization 🔸	Port Queue Status			
Internet Settings	Queue Management	Algorithm: Tail	Drop	
Network Settings				
LAN QoS D				
VPN Settings				
VLAN Settings				

2.2.3 Option QoS Configuration

Setup > LAN QoS > Option QoS Configuration

This page allows configuring the Option QoS and defining the bandwidth for Option intefaces.

Figure 11: Option QoS Configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨		Operation	succeeded	
WLAN Global Settings				
AP Management 🔹 🕨				200001
WLAN Visualization 🕨				
Internet Settings	Option QoS			
Network Settings	Do you want to enat Management?:	ole Bandwidth 🗹		
LAN QoS D		Apply	Beset	
VPN Settings 🕨 🕨			lieser	
VLAN Settings	Option Configuration			
DMZ Setup	Option Interface	Upstream Bandwidth in	Kbps Downstrea	m Bandwidth in Kbps
USB Settings 🕨 🕨	Option 1	100000	50000	
	Option2	1000000	1000000	
		Apply	Reset	

Option QoS: To enable Bandwidth management select the check box and click Apply.

Option Configuration: Define the upstream.downstream for bandwidth for Option1 and Option 2 interfaces.

Bandwidth Profile: Click Add to define bandwidth profile

Bandwidth Management

Profile Name: Allows defining a profile name.

Priority: Select the priority of profile.

Maximum Bandwidth: Provide the maximum allowed bandwidth of the profile

Minimum Bandwidth: Provide the minimum allowed bandwidth of the profile

Option Interface: Select the interface Option1/Option2

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	BANDWIDTH MANAG	EMENT		LOGOUT
AP Management	Save Settings	Don't Save Setting	gs	
WLAN Visualization 🕨				
Internet Settings	Bandwidth Profile Co	nfiguration		
Network Settings	Profile Name:			
LAN QoS D	Priority:	Urg	gent 👻	
VPN Settings	Maximum Bandwi	dth:		
VLAN Settings	Minimum Bandwid	th:		
DMZ Setup				
USB Settings	Option Interface:	Op	otion1 👻	

Figure 12: Bandwidth Profile Configuration

2.2.4 Traffic Selector Configuration

Setup > LAN QoS > Traffic Selector Configuration

After you create a bandwidth profile, you can associate it with a traffic flow.
Figure 13: Traffic Selector Configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	TRAFFIC SELECTORS			LOGOUT
AP Management	Save Settings	Don't Save Settin		
WLAN Visualization 🔸	Save Settings		95	
Internet Settings	Traffic Selector Confi	iguration		
Network Settings	Available Profiles:	-	•	
LAN QoS D	Service:	A	۱Y 🗸	
VPN Settings	Traffic Selector Ma	atch Type: IP	-	
VLAN Settings	IP Address:			
DMZ Setup	MAC Address:			
USB Settings	Port Name:	Pa	ort 1 🖵	
	Available VI ANs:	1		
			•	
	DSCP Value:			

Available Profiles:Select one of the previously configured bandwidth profiles to associate this traffic selector.

Service: Select one of the services from the available services.

Traffic Selector Match Type:Choose the method foridentifying the host that is controlled by this traffic Selector: IP Address, MAC Address, Port Name, VLAN Name, DSCP value or BSSID.

IP Address: Enter IP Address of LAN host, if you chose IP as the Match Type.

MAC Address: Enter a valid MAC Address, if you chose MAC Address as the Match Type.

Port Name: Select the LAN port number, if you chose Port Name as the Match Type.

Available VLANs: Select a VLAN, if you chose VLAN Name as the Match Type.

DSCP value: Enter a valid DSCP value between 0 and 63, if choose DSCP as the Match Type.

2.2.5 LAN QoS Configuration

Setup > LAN QoS > LAN QoS Configuration

Enabling QoS on LAN is an advanced configuration, which is required only if you expect congestion on the traffic on the LAN ports. This page allows you to enable the configuration and configure each port's to trust a CoS or DSCP values in the packet.

SETUP	ADVANCED	TOOLS	STATUS
LAN QOS			LOGOUT
Save Settings	Don't Save Setting		
- Our countings		5-	
LAN QoS			
Enable QoS for LAN	l ports?: 🛛 📝		
LAN QoS Configuratio	n		
LAN Por	t	Classify Usi	ing
1		DSCP 🗸	
2		CoS 🚽	
3		CoS -	
			_
4		CoS 🗸	
5		CoS 🚽	
	SETUP LAN QOS Save Settings LAN QoS Enable QoS for LAM LAN QoS Configuratio LAN Por 1 2 3 4 4 5	SETUP ADVANCED LAN QOS Don't Save Setting Save Settings Don't Save Setting LAN QoS Don't Save Setting LAN QoS Image: Configuration setting LAN QoS Configuration Image: Configuration setting 1 1 2 1 3 1 4 1 5 1	SETUP ADVANCED TOOLS LAN QOS Save Settings Don't Save Settings LAN QoS Don't Save Settings LAN QoS Enable QoS for LAN ports?: Image: Classify Usion LAN QoS Configuration DSCP • 1 DSCP • 2 CoS • 3 CoS • 4 CoS • 5 CoS •

Figure 14: LAN QoS Configuration

LAN Port: This lisf out the available LAN ports

Classify Using: This provide the list of QoS services available on the port

2.2.6 801.p Configuration

Setup > LAN QoS > 801.p Configuration

Port CoS Mapping enables you to change the priority of the PCP value.

Figure 15: 801.p Configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	PORT COS MAPPING			LOGOUT
AP Management	Save Settings	Don't Save Setting		
WLAN Visualization 🔸	Save Settings		12	
Internet Settings	CoS to Port Priority	Queue Mapping		
Network Settings	CoS Valu	le	Priority Que	eue
LAN QoS D	0		Low	-
VPN Settings	1		Low	-
VLAN Settings	2		Low	-
DMZ Setup	3		Low	-
USB Settings				-
	4		Low	•
	5		Low	-
	6		Low	-
	7		Low	-

CoS Value: value of the cos in the PCP part of the LAN traffic.

Priority Queue::Priority for the particular CoS value

2.2.7 DSCP Configuration

Setup > LAN QoS > DSCP Configuration

This page allows configuring IP DSCP values to which you can map an internal traffic class.

DWC-1000	:	SETUP	A	DVANCED		TOOLS		STATUS
Wizard 🕨								
WLAN Global Settings	PORT D	SCP MAPPING						LOGOUT
AP Management 🕨 🕨		ve Settings	Don	't Save Setting				
WLAN Visualization 🕨		ve Settings	Don	t Save Setting	。			
Internet Settings 🔹 🕨	DSCP t	o Port Priority	Queue	Mapping				
Network Settings	DSCP	Queue	DSCP	Queue	DSCP	Queue	DSCP	Queue
LAN QoS D	0	Low 👻	1	Low 👻	2	Low 👻	3	Low 👻
VPN Settings	4	Low 👻	5	Low 👻	6	Low 👻	7	Low 👻
VLAN Settings	8	Low 👻	9	Low 👻	10	Low 👻	11	Low 👻
DMZ Setup	12	Low -	12	Low -	14	Low -	15	Low -
USB Settings	12		15		14		15	
	16	Low 👻	17	Low 👻	18	Low 👻	19	Low 👻
	20	Low 👻	21	Low 👻	22	Low 👻	23	Low 👻
	24	Low 👻	25	Low 👻	26	Low 👻	27	Low 👻
	28	Low 👻	29	Low 👻	30	Low 👻	31	Low 👻
	32	Low 👻	33	Low 👻	34	Low 👻	35	Low 👻
	36	Low 👻	37	Low 👻	38	Low 👻	39	Low 👻
	40	Low 👻	41	Low 👻	42	Low 👻	43	Low 👻
	44	Low 👻	45	Low 👻	46	Low 👻	47	Low 👻

Figure 16: DSCP Configuration

DSCP: Lists the IP DSCP values to which you can map an internal traffic class. The values range from 0-63.

Queue: This provides the priority of the queue

2.2.8 Remark CoS to DSCP

Setup > LAN QoS > Remark CoS to DSCP

Remarking CoS to DSCP is an advanced QoS configuration, where the Layer 2 quality of service field is translated to a Layer 3 QoS field in the packet, so that upstream routers can make a QoS decision based on the DSCP field set in the packet.

Figure 17: Remark CoS to DSCP

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨		Operation	succeeded	
WLAN Global Settings		•		
AP Management 🔹 🕨	PORT COS MAPPING			LOGOUT
WLAN Visualization 🕨	Save Settings	Don't Save Settin	gs	
Internet Settings 🔹 🕨				
Network Settings	Remark CoS to DSCP			
LAN QoS 👂	Do you want to enable C	CoS to DSCP		
VPN Settings	Marking?:			
VLAN Settings	Remark CoS to DSCP			
DMZ Setup 🕨	CoS		DSCP	
USB Settings	о		0 🗸	
	1		8 🗸	
	2		16 🗸	
	3		8 🗸	
	4		32 🗸	
	5		40 ~	
	6		48 🗸	

Once you enable CoS to DSCP marking by choosing the check box, you can choose the appropriate value of the DSCP for a given CoS value.

2.3 VLAN Configuration

The controller supports virtual network isolation on the LAN with the use of VLANs. LAN devices can be configured to communicate in a subnetwork defined by VLAN identifiers. LAN ports can be assigned unique VLAN IDs so that traffic to and from that physical port can be isolated from the general LAN. VLAN filtering is particularly useful to limit broadcast packets of a device in a large network

VLAN support is disabled by default in the controller. In the VLAN Configuration page, enable VLAN support on the controller and then proceed to the next section to define the virtual network.

Setup > VLAN Settings > Available VLAN

The Available VLAN page shows a list of configured VLANs by name and VLAN ID. A VLAN membership can be created by clicking the Add button below the List of Available VLANs.

A VLAN membership entry consists of a VLAN identifier and the numerical VLAN ID which is assigned to the VLAN membership. The VLAN ID value can be any number from 2 to 255. VLAN ID 1 is reserved for the default VLAN, which is used for untagged frames received on the interface. By enabling Inter VLAN Routing, you will allow traffic from LAN hosts belonging to this VLAN ID to pass through to other configured VLAN IDs that have Inter VLAN Routing enabled.

Figure 18: Adding VLAN memberships to the LAN

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨		Operation	succeeded	
WLAN Global Settings	AVATI ABLE VI ANS			LOGOUT
AP Management 🔹 🕨				
WLAN Visualization 🕨	This page shows a list of a page as well.	available VLANs which a user (an edit or delete. A use	r can add a new VLAN from this
Internet Settings 🔹 🕨	List of available VLAN	ls		
Network Settings		Name		ID
LAN QoS 🕨		Default		1
VPN Settings		VLAN1		2
VLAN Settings D				
DMZ Setup		Edit Del	ete Add	
USB Settings				

2.3.1 Associating VLANs to ports

In order to tag all traffic through a specific LAN port with a VLAN ID, you can associate a VLAN to a physical port.

Setup > VLAN Settings > Port VLAN

VLAN membership properties for the LAN and wireless LAN are listed on this page. The VLAN Port table displays the port identifier, the mode setting for that port and VLAN membership information. The configuration page is accessed by selecting one of the four physical ports or a configured access point and clicking Edit.

The edit page offers the following configuration options:

- Mode: The mode of this VLAN can be **General**, **Access**, or **Trunk**. The default is access.
- In **General** mode the port is a member of a user selectable set of VLANs. The port sends and receives data that is tagged or untagged with a VLAN ID. If the data into the port is untagged, it is assigned the defined PVID. In the configuration from Figure 6, Port 3 is a General port with PVID 3, so

untagged data into Port 3 will be assigned PVID 3. All tagged data sent out of the port with the same PVID will be untagged. This is mode is typically used with IP Phones that have dual Ethernet ports. Data coming from phone to the controller port on the controller will be tagged. Data passing through the phone from a connected device will be untagged.

DWC-1000		SETUP	ADVANCED		TOOLS	STATUS
Wizard 🕨						
WLAN Global Settings	PORT	VLANS				LOGOUT
AP Management 🕨	This pa	age allows user to configu	ure the port VLANs	. A user can ch	oose ports and can	add them into a VLAN.
WLAN Visualization 🔸	Port \	/LANs				
Internet Settings		Port Name	Mode	PVID	VLAN	Membership
Network Settings		Port 1	Access	1		1
LAN QoS 🕨		Port 2	Access	1		1
VPN Settings		Port 3	Access	1		1
VLAN Settings		Port 4	Access	1		1
DMZ Setup				Edit		
USB Settings						

Figure 19: Port VLAN list

- In Access mode the port is a member of a single VLAN (and only one). All data going into and out of the port is untagged. Traffic through a port in access mode looks like any other Ethernet frame.
- In **Trunk** mode the port is a member of a user selectable set of VLANs. All data going into and out of the port is tagged. Untagged coming into the port is not forwarded, except for the default VLAN with PVID=1, which is untagged. Trunk ports multiplex traffic for multiple VLANs over the same physical link.
- Select PVID for the port when the General mode is selected.
- Configured VLAN memberships will be displayed on the VLAN Membership Configuration for the port. By selecting one more VLAN

membership options for a General or Trunk port, traffic can be routed between the selected VLAN membership IDs

Figure 20: Configuring VLAN membership for a port

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard				
WLAN Global Settings	VLAN CONFIGURATION	N		LOGOUT
AP Management 🕨	This page allows user to co	onfigure the port VLAN.		
WLAN Visualization 🔸	VLAN Configuration			
Internet Settings	Port Name:	Port	1	
Network Settings	Mode:	Acc	cess 🔻	
LAN QoS 🕨	PVID.	1		
VPN Settings				
VLAN Settings		Apply	Cancel	
DMZ Setup	VLAN Membership Co	nfiguration		
USB Settings 🔶	VI AN Membership:	1 🗸		2
		L		
		Apply	Cancel	

2.3.2 Multiple VLAN Subnets

Setup > VLAN Settings > Multiple VLAN Subnets

Each configured VLAN ID can map directly to a subnet within the LAN. Each LAN port can be assigned a unique IP address and a VLAN specific DHCP server can be configured to assign IP address leases to devices on this VLAN.

VLAN ID: The PVID of the VLAN that will have all member devices be part of the same subnet range.

IP Address: The IP address associated with a port assigned this VLAN ID.

Subnet Mask: Subnet Mask for the above IP Address.

The following actions are supported from this page:

Edit: The Edit button will link to the Port VLAN Configuration page, allowing you to make changes to the selected port VLAN attributes.

Figure 21: Multiple VLAN Subnets

DWC-1000		SETUP	ADVANCED	TOOLS	STATUS		
Wizard 🕨							
WLAN Global Settings	MUL	TI VLAN SUBNETS			LOGOUT		
AP Management 🔹 🕨	This	page shows a list of a	vailable multi-vlan subnets.∣	User can even edit the multi-	vlans from this page.		
WLAN Visualization 🕨							
Internet Settings		Vlan ID	IP Address		Subnet Mask		
Network Settings		1	192.168.10.1	1 :	255.255.255.0		
LAN QoS 🕨		2	192.168.2.1		255.255.255.0		
VPN Settings 🕨 🕨							
VLAN Settings D			Ec	ait			
DMZ Setup ▶							

2.4 Configurable Port: DMZ Setup

This controller supports one of the physical ports (Option Ports) to be configured as a secondary Ethernet port or a dedicated DMZ port. A DMZ is a subnetwork that is open to the public but behind the firewall. The DMZ adds an additional layer of security to the LAN, as specific services/ports that are exposed to the internet on the DMZ do not have to be exposed on the LAN. It is recommended that hosts that must be exposed to the internet (such as web or email servers) be placed in the DMZ network. Firewall rules can be allowed to permit access specific services/ports to the DMZ from both the LAN or Option. In the event of an attack to any of the DMZ nodes, the LAN is not necessarily vulnerable as well.

Setup > DMZ Setup > DMZ Setup Configuration

DMZ configuration is identical to the LAN configuration. There are no restrictions on the IP address or subnet assigned to the DMZ port, other than the fact that it cannot be identical to the IP address given to the LAN interface of this gateway.

Figure 22: DMZ configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
Internet Settings 🛛 🕨	DMZ SETUP			LOGOUT
Wireless Settings 🛛 🕨	The De-Militarized Zone (D	MZ) is a network which, when	n compared to the LAN, has f	ewer firewall restrictions.
Network Settings 🛛 🕨	by default. This zone can	be used to host servers and ,	give public access to them.	,
DMZ Setup 🕞	Save Settings	Don't Save Setting	s	
VPN Settings 🔹 🕨	DMZ Port Setup			
USB Settings	IP Address:	176	.16.2.1	
VLAN Settings	Subnet Mask:	255	.255.255.0	
	DHCP for DMZ Conne	cted Computers		
	DHCP Mode:		ICP Server 👻	
	Starting ID Addres	s: [176	16 2 100	
	Ending ID Address	170	16.2.254	
			.10.2.234	
	Primary DNS Server	· _		
	Secondary DNS Ser	ver:		
	WINS Server:			
	Lease Time:	24		
	Relay Gateway:			
	DMZ Proxy			
	Enable DNS Proxy:			

In order to configure a DMZ port, the controller configurable port must be set to DMZ in the Setup > Internet Settings > Configurable Port page.

2.5 Universal Plug and Play (UPnP)

The following feature is available upon licensed activation of VPN / Firewall features for the system.

Advanced > Advanced Network > UPnP

Universal Plug and Play (UPnP) is a feature that allows the controller to discovery devices on the network that can communicate with the controller and allow for auto configuration. If a network device is detected by UPnP, the controller can open internal or external ports for the traffic protocol required by that network device.

Once UPnP is enabled, you can configure the controller to detect UPnP-supporting devices on the LAN (or a configured VLAN). If disabled, the controller will not allow for automatic device configuration.

Configure the following settings to use UPnP:

Advertisement Period: This is the frequency that the controller broadcasts UPnP information over the network. A large value will minimize network traffic but cause delays in identifying new UPnP devices to the network.

Advertisement Time to Live: This is expressed in hops for each UPnP packet. This is the number of steps a packet is allowed to propagate before being discarded. Small values will limit the UPnP broadcast range. A default of 4 is typical for networks with few contorollers.

Figure 23: UPnP Configuration

DWC-1000	SETUP	ADV	ANCED	TOOLS		STATUS
Global 🕨		Please enab	le UPnP to refr	esh UPnP Portmap	Table.	
Peer Controllers	HDoD					LOGOUT
AP Profile	UP IIP					Lodoor
SSIDs	UPnP (Universal P communicate with	lug and Play) is a feat this security applianc	ture that allows f e	or automatic discover	y of device	es that can
WIDS Security	Save Setti	ngs Don't	Save Settings			
Captive Portal						
Client	UPnP Enable					
Application Rules	Do you wan	t to enable UPnP	?			
Website Filter 🕨 🕨	LAN:		LAN			
Firewall Settings	Advertiseme	nt Period:	180	D	(In Secs)	
IPv6	Advertiseme	nt Time To Live:	4		(In Hops)	
Advanced Network D	UPnP Port map	o Table				
Routing	Active	Protocol	Int. Port	Ext. Port	t	IP Address
Certificates			Refr	esh		
Users >						

UPnP Port map Table

The UPnP Port map Table has the details of UPnP devices that respond to the controller advertisements. The following information is displayed for each detected device:

Active: A yes/no indicating whether the port of the UPnP device that established a connection is currently active

Protocol: The network protocol (i.e. HTTP, FTP, etc.) used by the DWC

Int. Port (Internal Port): The internal ports opened by UPnP (if any)

Ext. Port (External Port): The external ports opened by UPnP (if any)

IP Address: The IP address of the UPnP device detected by this controller

Click Refresh to refresh the portmap table and search for any new UPnP devices

2.6 Captive Portal

LAN and WLAN users can gain internet access via web portal authentication with the DWC. Also referred to as Run-Time Authentication, a Captive Portal is ideal for a web café scenario where users initiate HTTP connection requests for web access but are not interested in accessing any LAN services. The LAN and WLAN users can access captive portal using HTTP. Firewall policies underneath will define which users require authentication for HTTP access, and when a matching user request is made the DWC will intercept the request and prompt for a username / password. The login credentials are compared against the RunTimeAuth users in user database prior to granting HTTP access.

Captive Portal is available for LAN and WLAN users only and not for DMZ hosts.

2.6.1 Captive Portal Setup

Advanced > Captive Portal > Setup

Captive Portal Policies

The List of Available CaptivePortal Policies are shown in this table.

Policy Name: Set the Name of the Particular Policy which is to be configured.

Status: The status of the Policy can be enabled (active) or Disabled (configured but not in use).

In Interface: The source Interface of the traffic that is controlled by this Captive Portal: LAN or VLANS.

Out Interface: The destination Interface of the traffic that is controlled by this Captive Portal: Option or DMZ.

Figure 24: Captive Portal Setup

DWC-1000		SETUP	A	DVANCED		TOOLS		STATUS
Global 🕨								
Peer Controllers	САРТ	IVE PORTAL SET	UP					LOGOUT
AP Profile	Capt use t	ive Portal is a securit his page to manage	ty mechar the Policie	nism to selectives and Profile	vely prov s of Capt	vide authenticatio ivePortal.	n on cer	tain interfaces.You can
SSIDs								
WIDS Security	Capt	ive Portal Policie	25					
Captive Portal D		Policy Name		Status	I	n Interface		Out Interface
Client		Edit	Er	nable	Disa bl	e Delete	•	Add
Application Rules	List	of Available Prof	iles					
Website Filter 🕨 🕨		Profile Nam	ie	Stat	us		A	ction
Firewall Settings	۲	default		In U	se		Show	Preview
IPv6 ►	\odot	default2		Not In	Use		Show	Preview
Advanced Network		E	nable	Edit		Delete	Add	
Routing 🕨								

The following actions are supported from this page:

Edit: Can edit the added policies.

Enable: Can enable the added policies.

Disable: Can disable the added Policies.

Delete: Will delete the Policy selected.

Add: Will let you add a new policy.

List of Available Profiles

Any one of these profiles can be used for Captive Portal Login page while enabling Captive Portal.

Enable: Can enable the added profiles.

Edit: Can edit the added profiles. The default Profile cant be edited.

Delete: Will delete the profile selected. You cannot delete the default profile and the current profile being used.

Add: Will let you add a new profile. Maximum allowed number of profiles are 5 excluding default.

Show Preview: Will show preview of the page, if a profile is selected.

Configure Captive Portal Policies

This allows to add a captive portal policy or to edit the configuration of an exisiting policy.

Policy Name: Set the Name of the Particular Policy which is to be configured.

From Interface: The source Interface of the traffic that is controlled by this Captive Portal: LAN or VLAN's

To Interface: The destination Interface of the traffic that is controlled by this Captive Portal: Option or DMZ.

Enable: This enables the captive portal policy.

Figure 25: Configuring a captive portal policy

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨 🕨				
Peer Controllers	CAPTIVE PORTAL CON	FIGURATION		LOGOUT
AP Profile	This page allows you to a	add a new captive Portal Po	licy or edit the configuration	n of an existing Policy.
SSIDs	The details will then be d	lisplayed in the List of Capt	ive Portal Policies table on t	he cpSetup page.
WIDS Security	Save Settings	Don't Save Settin	ngs	
Captive Portal	Captive Portar Connig	ttings		
Client	Policy Name:	All	ow	
IPv6 ►				
Routing 🕨 🕨	From InterfaceName	: LA	NV	
Certificates	To InterfaceName:	Op	otion 🗸	
Users 🕨	Enable:			

Captive Portal Configuration

Captive portal login page display can be altered by modifying the settings available here.

<u>General Details</u>:

ProfileName: Name of the profile that is being added.

Browser Title: It is the browser title.

Page Background Color: Sets the background color of the page.

Custom Color: It allows choosing the custom background color

Figure 26: Captive Portal Configuration (Part-1)

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	CUSTOMIZED CAPTIVE	PORTAL SETUP		LOGOUT
AP Profile	Captive Portal Login page	is used for authentication on	Captive Portal enabled interfa	aces.
SSIDs	Save Settings	Don't Save Settin	gs	
WIDS Security				
Captive Portal	General Details			
Client	Profile Name:	SA	м	
IPv6	Browser Title:	We	elcome	
Routing 🕨 🕨	Page Background C	olor:		
Certificates	rage baokground of			_
Users 🕨	Custom Color: (#)			(CFooCF)
IP/MAC Binding	Header Details			
Radius Settings	Background:	Im	nage 🗸	
Switch Settings	• • •	0	0 0	0
	Detault <u>Ad</u>	<u>ld Add</u>	Add Add	<u>d Add</u>
	Header Background	Color:	hite •	_
	Custom Color: (#)			(CF00CF)
	Header Caption:			
	Caption Font:	Та	homa 🗸 🗸	
	Font Size:	Sn	nall 🗸 🗸	
	Font Color:	Re	sd 🗸	

Font Color:	Red 🗸
Login Details	
Login Section Title:	CAPTIVE PORTAL LOGIN
5	(Opional)
Welcome Message:	Please Login!
	Invalid UserName/Password
Error Message:	(Optional)
Advertisement Details	
Enable Advertisement:	
Ad Place:	Right -
Ad Content:	
Font:	Tahoma
Font Size:	Small 👻
Font Color:	Red _
Footer Details	
Change Footer Content:	
Footer Content:	
Footer Font Color:	White -

Figure 27: Captive Portal Configuration (Part-2)

<u>Header Details</u>: It allows user to configure how the header portion of the page should be displayed.

Background: Sets the background for the header portion.

Add: Will let you add a new image. This image can be set as header image for this profile.

Header Background Color:

Custom Color: It allows choosing the custom header background color

Header Caption: Text to be displayed in the header portion.

Caption Font: Font of the header text to be displayed.

Font Size: Font size for the header text to be displayed.

Font Color: Color in which the text is to be displayed.

Login Details:

Login Section Title: Title for the Login Box

Welcome Message: Message which is displayed when a user visits the page.

Error Message: Error Message displayed when user enters invalid credentials.

Advertisement Details:

Enable Advertisement: This is to enable advertisement in login page, where user can configure the custom messages/information that is needed to be displayed in the CaptivePortal login page.

Ad Place: The location of the advertisement content to be displayed

Ad Content: The content of the advertisement in the login page.

Font: Font for the information to be displayed.

Font Size: Font size for the information to be displayed.

Font Color: Color in which the information is to be displayed.

Footer Details:

Change Footer Content: It allows user to configure the footer portion of the page.

Footer Content: It allows user to add the footer content.

Footer Font Color: Color in which the footer is to be displayed.

2.6.2 Captive Portal Session

Advanced > Captive Portal > Captive Portal Sessions

The Active Runtime internet sessions through the controller firewall are listed in the below table. These users are present in the local or external user database and have had their login credentials approved for internet access. A 'Disconnect' button allows the DWC-1000 admin to selectively drop an authenticated user.

Figure 28: Active Runtime sessions

DWC-1000///	SETUP	ADVANCED	TOOLS	STATUS	HELP
Application Rules 🕨					Helpful Hints
Website Filter 🕨	CAPTIVE PORTAL SES	SIONS		LOGOUT	Use this page to monitor
Firewall Settings	This page displays a list of	f active run time sessions or	n your router.		the runtime authentication sessions that are active on your router.
Wireless Settings 🕨	List of Captive Portal S	Sessions			More
Advanced Network	Use	ername	IP Ad	ress	
Routing	m	aheshb	192.168	.17.38	
Certificates	siv	akumar	192.168	.17.41	
Users 🕨		Disco	nneet		
IP/MAC Binding		01300	in eot		
IPv6					
Radius Settings					
Captive Portal					
Switch Settings					
Intel [®] AMT					

2.6.3 WLAN CP Interface Association

Advanced > Captive Portal > WLAN CP Interface Association

From the Interface Association page, you can associate a configured captive portal with a specific physical interface or wireless network (SSID). The CP feature only runs on the wired or wireless interfaces that you specify. A CP can have multiple interfaces associated with it, but an interface can be associated to only one CP at a time.

CP Configuration: Lists the captive portals configured on the controller by number and name.

Associated Interfaces: Lists the interfaces that are currently associated with the selected captive portal. Wireless interfaces are identified by the wireless network number and SSID. Physical (wired) interfaces are identified by the Port Description that includes slot number, port number, and interface type.

Interface List: Lists the interfaces available on the controller that are not currently associated with a CP. Wireless interfaces are identified by the wireless network

number and SSID. Physical (wired) interfaces are identified by the Port Description that includes slot number, portnumber, and interface type.

Figure 29: WLAN CP Interface Association

DWC-1000	SETUP		ADVANCED	TOOLS	STATUS
Global 🕨					
Peer Controllers	CAPTIVE POR	TAL			LOGOUT
AP Profile	Description doe	s here			
SSIDs	beschpton get				
WIDS Security	Captive Porta	al Interf	face association		
Captive Portal	CP Configuration	1 - Defa	ault 👻		
Client		6/1-Wire	eless Network 1 - dlink1	<u>^</u>	
Application Rules		6/3-Wire	eless Network 3 - dlink2	5 ≡	
Website Filter 🔹 🕨	Interface List	6/4-Wire 6/5-Wire	eless Network 4 - dlink4 eless Network 5 - dlink5		
Firewall Settings		6/6-Wire	eless Network 6 - dlink6 eless Network 7 - dlink7	5	
IPv6		6/8-Wire	eless Network 8 - dlink8		
Advanced Network			Add		
Routing 🕨	Г		Add		
Certificates					
Users 🕨	Associated				
IP/MAC Binding	Interfaces				
Radius Settings		_			
Switch Settings		Ŧ			
Intel [®] AMT			Delete		

Use the following steps to associate one or more interfaces with a captive portal.

1. Select the desired captive portal from the CP Configuration list.

2. Select the interface or interfaces from the Interface List. To select more than one interface, hold CTRL and click multiple interfaces.

3. Click Add

Use the following steps to remove an interface from the Associated Interfaces list for a captive portal.

1. Select the desired captive portal from the CP Configuration list.

2. In the Associated Interfaces field, select the interface or interfaces to remove. To select more than one interface, hold CTRL and click multiple interfaces.

3. Click **Delete**. The interface is removed from the Associated Interface list and appears in the Interface List.

2.7 WLAN global configuration

Setup > WLAN Global Settings

Following are the options available to enable the WLAN function on DWC-1000

Enable WLAN Controller: Select this option to enable WLAN controller functionality on the system. Clear the option to administratively disable the WLAN controller. If you clear the option, all peer controller and APs that are associated with this controller are disassociated. Disabling the WLAN controller does not affect non-WLAN features on the controller, such as VLAN or STP functionality.

WLAN Controller Operational Status: Shows the operational status of the controller. The status can be one of the following values:

- Enabled
- Enable-Pending
- Disabled
- Disable-Pending

Figure 30: WLAN global configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨			·	
WLAN Global	GLOBAL STATUS			LOGOUT
Settings	This same will evide use			WC 1000
AP Management 🕨	global settings.Make su	re that WLAN controller is	being enabled.	WC-1000 Rober WLAIN
WLAN Visualization >				
Internet Settings	Submit	Don't Save Settin	gs	
Network Settings	Wireless Global Conf	figuration		
LAN QoS	Enable WLAN Cont	troller 🛛	1	
VPN Settings	WLAN Controller (Operational En	abled	
VLAN Settings		19	2 168 10 1	
DMZ Setup	IF Address,		2.100.10.1	
USB Settings	AP Validation			
	AP MAC Validation	n: L	ocal 🚽	
	Require Authentic	ation Passphrase:]	
	RADIUS Server Con	figuration		
	RADIUS Authentic Name:	cation Server	efault-RADIUS-Server	
	RADIUS Authentic Status:	cation Server No	t Configured	
	RADIUS Accountin	ng Server Name: D	efault-RADIUS-Server	
	RADIUS Accountin	ng Server Status: No	t Configured	
	RADIUS Accountin	ng:]	
	Country Configuration	on		
	Country Code:	U	S - United States	•

IP Address: This field shows the IP address of the WLAN interface on the controller. If the controller does not have the Routing Package installed, or if routing is disabled, the IP address is the network interface. If the routing package is installed and enabled, this is the IP address of the routing or loopback interface you configure for the controller features.

AP MAC Validation Method: Add the MAC address of the AP to the Valid AP database, which can be kept locally on the controller or in an external RADIUS server. When the controller discovers an AP that is not managed by another

ccontroller, it looks up the MAC address of the AP in the Valid AP database. If it finds the MAC address in the database, the controller validates the AP and assumes management. Select the database to use for AP validation and, optionally, for authentication if the Require Authentication Passphrase option is selected.

- Local: If you select this option, you must add the MAC address of each AP to the local Valid AP database.
- **RADIUS**: If you select this option, you must configure the MAC address of each AP in an external RADIUS server.

Require Authentication Passphrase: Select this option to require APs to be authenticated before they can associate with the controller. If you select this option, you must configure the passphrase on the AP while it is in standalone mode as well as in the Valid AP database.

RADIUS Authentication Server Name: Enter the name of the RADIUS server used for AP and client authentications. The name can contain up to 32 alphanumeric characters. Spaces, underscores, and dashes are also permitted. The controller acts as the RADIUS client and performs all RADIUS transactions on behalf of the APs and wireless clients.

RADIUS Authentication Server Configured: Indicates whether the RADIUS authentication server is configured.

RADIUS Accounting Server Name: Enter the name of the RADIUS server used for reporting wireless client associations and disassociations. The name can contain up to 32 alphanumeric characters. Spaces, underscores, and dashes are also permitted.

RADIUS Accounting Server Configured: Indicates whether the RADIUS accounting server is configured.

RADIUS Accounting: Select to enable RADIUS accounting for wireless clients.

Country Code: Select the country code that represents the country where your controller and APs operate. When you click Submit, a pop-up message asks you to confirm the change. Wireless regulations vary from country to country. Make sure you select the correct country code so that your WLAN system complies with the regulations in your country.

2.8 Wireless Discovery configuration

The wireless controller can discover, validate, authenticate, or monitor the following system devices:

- Peer wireless controllers
- APs
- Wireless clients
- Rogue APs
- Rogue wireless clients

Setup > AP Management > Poll List

The wireless controller can discover peer wireless controller and APs regardless of whether these devices are connected to each other, located in the same Layer 2 broadcast domain, or attached to different IP subnets. In order for the controller to discover other WLAN devices and establish communication with them, the devices must have their own IP address, must be able to find other WLAN devices, and must be compatible. When the controller discovers and validates APs, the controller takes over the management of the AP. If you configure the AP in Standalone mode, the existing AP configuration is replaced by the default AP Profile configuration on the controller.

L3/IP Discovery: Select or clear this option to enable or disable IP-based discovery of access points and peer wireless controller. When the L3/IP Discovery option is selected, IP polling is enabled and the controller will periodically poll each address in the configured IP List. By default, L3/IP Discovery is enabled.

List of IP Address: Shows the list of IP addresses configured for discovery.

To remove entries from the list, select one or more entries and click Delete. Hold the "shift" key or "control" key to select specific entry.

IP Address Range: This text field is used to add a range of IP address entries to the IP List. Enter the IP address at the start of the address range in the From field, and enter the IP address at the end of the range in the To field, then

click Add. All IP addresses in the range are added to the IP List. Only the last octet is allowed to differ between the From address and the To address.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard +				
WLAN Global Settings	POLL LIST			LOGOUT
AP Management	This was contain all the	information about TD Address	9. Man unkna utkiak ana	he and a set for more
WLAN Visualization	controllers & controllers for the LWS to discover	The IP Discovery list can con	tain the IP addresses of p	peer controller and APs
Internet Settings	Submit	Refresh]	
Network Settings	Gubinit	Kerrean	J	
LAN QOS				
VPN Settings	L3/IP Discovery	\checkmark		
VLAN Settings	L2/VLAN Discovery			
DMZ Setup	List of IP Adresses			
USB Settings +	192.168.10.101 🔺			
	.	Delete		
	IP Address Range		From	То
			A	td
	List of IP vians			
	-			
	Delete			
	VLAN (1-4094)			

Figure 31: Configuring the Wireless Discovery

L2/VLAN Discovery: The D-Link Wireless Device Discovery Protocol is a good discovery method to use if the controller and APs are located in the same Lay er 2

multicast domain. The wireless controller periodically sends a multicast packet containing the discovery message on each VLAN enabled for discovery

The following actions are supported from this page:

Add: Adds the data in the IP Address or VLAN field to the appropriate list.

Delete: Deletes the selected entry from the IP or VLAN list.

2.8.1 Wireless Discovery Status

Status > Global Info > IP Discovery

The IP Discovery list can contain the IP addresses of peer controller and APs for the DWC-1000 to discover and associate with as part of the WLAN

IP Address: Shows the IP address of the device configured in the IP Discovery list

Status: The wireless discovery status is in one of the following states:

- Not Polled: The controller has not attempted to contact the IP address in the L3/IP Discovery list.
- **Polled**: The controller has attempted to contact the IP address.
- **Discovered**: The controller contacted the peer controller or the AP in the L3/IP Discovery list and has authenticated or validated the device.
- **Discovered Failed**: The controller contacted the peer controller or the AP with IP address in the L3/IP Discovery list and was unable to authenticate or validate the device.

If the device is an access point, an entry appears in the AP failure list with a failure reason.

Figure 32: Wireless Discovery status

DWC-1000	SETUP	ADVANCED	TOOLS		STATUS
Dashboard 🕨 🕨					
Global Info D	IP DISCOVERY				LOGOUT
Device Info	The IR Discovery Status	page chows information abo	ut communication :	with the d	lawices in the ID discovery
Access Point Info	list on the Set up > AP M	lanagement > Poll List page.	ou communication (wan the d	levices in the IP discovery
LAN Clients Info	Ip Discovery				
Wireless Client Info 🔶		IP Address			Status
Logs 🕨 🕨		192.168.10.101			Polled
Traffic Monitor					
Active Sessions		Re	etresh		
Active VPNs					

The following actions are supported from this page:

Refresh: Updates the page with the latest information

2.8.2 AP Profile Global Configuration

Advanced > AP Profile

Access Point Profile Summary page, you can Add, Copy, Edit, Delete AP profiles. To add a new profile, click Add in AP Profile Summary page. In the AP Profile Global Configuration page, enter the name of the profile in the Profile Name field, select Hardware type and enter the valid VLAN ID and then click Submit.

Figure	33: AP	Profile	Global	Configuration
--------	--------	---------	--------	---------------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	AP PROFILES SUMMA	RY		LOGOUT
AP Profile	This page is used to page	inverse verifier of slabal set	tions for a new or eviction A	D accéla
SSIDs	Submit	Dep't Save Settin	angs for a new or existing A	P prone.
WIDS Security	Subinit	Don't Save Settin	95	
Captive Portal	AP Profile Global Con	figuration		
Client	Profile Name:	De	efault	
Application Rules	Hardware Type:	D	WL-8600AP Dual Radio a/b	√g/n 👻
Website Filter 🕨 🕨	Wired Network Dis	covery VLAN ID: 4	(1 t	255)
Firewall Settings				
IPv6 ►				

Profile Name: The Access Point profile name you added. Use 0 to 32 characters. Only alphanumeric characters are allowed. No special characters are allowed.

Hardware Type: Select the hardware type for the APs that use this profile. The hardware type is determined, in part, by the number of radios the AP supports (single or dual) and the IEEE 802.11 modes that the radio supports (a/b/g or a/b/g/n). The option available in the Hardware Type ID is:

- DWL-8600AP Dual Radio a/b/g/n
- DWL-3600AP Single Radio b/g/n
- DWL-6600AP Dual Radio a/b/g/n

Wired Network Discovery VLAN ID: Enter the VLAN ID that the controller uses to send tracer packets in order to detect APs connected to the wired network.

AP Profile

Advanced > AP Profile

Access point configuration profiles are a useful feature for large wireless networks with APs that serve a variety of different users. You can create multiple AP profiles on the Controller to customize APs based on location, function, or other criteria. Profiles are like templates, and once you create an AP profile, you can apply that profile to any AP.

Figure 34: AP Profile List

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	AP PROFILES SUMMA	RY		LOGOUT
AP Profile		_		
SSIDs	AP profiles on the Unified	Summary page, you can crea Wireless Controller.	te, copy, or delete AP profile:	s. You can create up to 16
WIDS Security				
Captive Portal	Access Point Profile L	ist		
Client	Prof	ile	Profile Stat	tus
Application Dulas	✓ 1-Def	ault	Configured	t b
Application Rules V	2-Def	ault	Configured	d
Website Filter				
Firewall Settings	Edit	Delete A	dd Copy	Apply
IPv6	Configu	re Radio 🛛 Configu	re SSID Configu	re QoS

For each AP profile, you can configure the following features:

• Profile settings

(Name, Hardware Type ID, Wired Network Discovery VLAN ID)

- Radio settings
- SSID settings
- QoS settings

Profile: The Access Point profile name you added. Use 0 to 32

characters.

Profile Status: can have one of the following values:

• **Associated**: The profile is configured, and one or more APs managed by the controller are associated with this profile.

• Associated-Modified: The profile has been modified since it was applied to one or more associated APs; the profile must be re-applied for the changes to take effect.

• **Apply Requested**: After you select a profile and click Apply, the screen refreshes and shows that an apply has been requested.

• **Apply In Progress**: The profile is being applied to all APs that use this profile. During this process the APs reset, and all wireless clients are disassociated from the AP.

• **Configured**: The profile is configured, but no APs managed by the controller currently use this profile.

Associate a profile with an AP. Entry of the AP is valid and available in database of the controller.

The following actions are supported from this page:

Edit: To edit the existing AP profile.

Delete: To delete the existing AP profile.

Add: Add a new AP profile

Copy: Copy the existing AP profile.

Apply: Update the AP profile configuration details entered.

Configure Radio: Allows configuration of the AP profile Radio configuration.

Configure SSID: Allows configuration of the AP profile VAP configuration.

Configure QoS: Allows configuration of the AP profile QoS configuration.

Radio Configuration

Radio Mode: From this field, you can select the radio that you want to configure. By default, Radio 1 operates in IEEE 802.11a/n mode, and Radio 2 operates in IEEE 802.11b/g/n mode. If you change the mode, the labels for the radios change accordingly. Changes to the settings apply only to the selected radio.The DWL-3600AP is a single-radio AP. Any settings you configure for Radio 1 (802.11a/n) are not applied to the DWL-3600AP. If the selected Hardware Type ID for the AP profile is DWL-3600AP, the radio selectors are not available.

State: Specify whether you want the radio on or off by clicking On or Off. If you turn off a radio, the AP sends disassociation frames to all the wireless clients it is currently supporting so that the radio can be gracefully shutdown and the clients can start the association process with other available APs

RTS: Threshold Specify a Request to Send (RTS) Threshold value between 0 and 2347. The RTS threshold indicates the number of octets in an MPDU, below which an RTS/CTS handshake is not performed. Changing the RTS threshold can help control traffic flow through the AP, especially one with a lot of clients. If you specify a low threshold value, RTS packets will be sent more frequently. This will consume more bandwidth and reduce the throughput of the packet. On the other hand, sending more RTS packets can help the network recover from interference or collisions which might occur on a busy network, or on a network experiencing electromagnetic interference.

Load Balancing: If you enable load balancing, you can control the amount of traffic that is allowed on each of the active AP's.

Load Utilization: This field allows you to set a threshold for the percentage of network bandwidth utilization allowed on the radio. Once the level you specify is reached, the AP stops accepting new client associations. Enter a percentage of utilization from 1 to 100.

Maximum Clients: Specify the maximum number of stations allowed to associate with this access point at any one time. You can enter a value between 0 and 200.

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RF Scan Other Channels: The access point can perform RF scans to collect information about other wireless devices within range and then report this information to the DWC-1000 wireless controller. If you select the Scan Other Channels option, the radio periodically moves away from

the operational channel to scan other channels. Enabling this mode causes the radio to interrupt user traffic, which may be noticeable with voice connections. When the Scan Other Channels option is cleared, the AP scans only the operating channel.

RF Scan Sentry: Select this option to allow the radio to operate in sentry mode. When the RF Scan Sentry option is selected, the radio primarily performs dedicated RF scanning. The radio passively listens for beacons and traffic exchange between clients and other access points but does not accept connections from wireless clients. In sentry mode, all VAPs are disabled. Networks that deploy sentry APs or radios can detect devices on the network quicker and perform more through security analysis. In this mode, the radio controllers from one channel to the next. The length of time spent on each channel is controlled by the scan duration. The default scan duration is 10 milliseconds.

Mode: The Mode defines the Physical Layer (PHY) standard the radio uses. Select one of the following modes for each radio interface.

Radio 1 supports:

• IEEE 802.11a is a PHY standard that specifies operating in the 5 GHz U-NII band using orthogonal frequency division multiplexing (OFDM). It supports data rates ranging from 6 to 54 Mbps.

• IEEE 802.11a/n operates in the 5 GHz ISM band and includes support for both 802.11a and 802.11n devices. IEEE 802.11n is an extension of the 802.11 standard that includes multiple-input multiple-output (MIMO) technology. IEEE 802.11n supports data ranges of up to 248 Mbps and nearly twice the indoor range of 802.11 b, 802.11g, and 802.11a.

• 5 GHz IEEE 802.11n is the recommended mode for networks with 802.11n devices that operate in the 5 GHz frequency that do not need to support 802.11a or 802.11b/g devices. IEEE 802.11n can achieve a

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higher throughput when it does not need to be compatible with legacy devices (802.11b/g or 802.11a).

Radio 2 supports:

• IEEE 802.11b/g operates in the 2.4 GHz ISM band. IEEE 802.11b is an enhancement of the initial 802.11 PHY to include 5.5 Mbps and 11 Mbps data rates. It uses direct sequence spread spectrum (DSSS) or frequency hopping spread spectrum (FHSS) as well as complementary code keying (CCK) to provide the higher data rates. It supports data rates ranging from 1 to 11 Mbps. IEEE 802.11g is a higher speed extension (up to 54 Mbps) to the 802.11b PHY. It uses orthogonal frequency division multiplexing (OFDM). It supports data rates ranging from 1 to 54 Mbps.

• IEEE 802.11b/g/n operates in the 2.4 GHz ISM band and includes support for 802.11b, 802.11g, and 802.11n devices.

• 2.4 GHz IEEE 802.11n is the recommended mode for networks with 802.11n devices that operate in the 2.4 GHz frequency that do not need to support 802.11a or 802.11b/g devices. IEEE 802.11n can achieve a higher throughput when it does not need to be compatible with legacy devices (802.11b/g or 802.11a).

DTIM Period: The Delivery Traffic Information Map (DTIM) message is an element included in some

Beacon frames. It indicates which client stations, currently sleeping in lowpower mode, have data buffered on the access point awaiting pick-up. The DTIM period you specify indicates how often the clients served by this access point should check for buffered data still on the AP awaiting pickup.

Specify a DTIM period within the given range (1-255). The measurement is in beacons. For example, if you set this field to 1, clients will check for buffered data on the AP at every beacon. If you set this field to 10, clients will check on every 10th beacon.

Beacon Interval: Beacon frames are transmitted by an access point at regular intervals to announce the existence of the wireless network. The default behavior is to send a beacon frame once every 100 milliseconds (or

10 per second). The Beacon Interval value is set in milliseconds. Enter a value from 20 to 2000.

Automatic Channel: The channel defines the portion of the radio spectrum that the radio uses for transmitting and receiving. The range of channels and the default channel are determined by the Mode of the radio interface. When the AP boots, each AP radio scans the RF area for occupied channels and selects a channel from the available non-interfering or clear channels. However, channel conditions can change during operation. Enabling the Automatic Channel makes the radio of APs assigned to this profile eligible for auto-channel selection. You can automatically or manually run the autochannel selection algorithm to allow the DWC-1000 controller to adjust the channel on APs as WLAN conditions change.

Automatic Power: The power level affects how far an AP broadcasts its RF signal. If the power level is too low, wireless clients will not detect the signal or experience poor WLAN performance. If the power level is too high, the RF signal might interfere with other APs within range. Automatic power uses a proprietary algorithm to automatically adjust the RF signal to broadcast far enough to reach wireless clients, but not so far that it interferes with RF signals broadcast by other APs. The power level algorithm increases or decreases the power level in 10% increments based on presence or absence of packet retransmission errors.

Initial Power: The automatic power algorithm will not reduce the power below the number you set in the initial power field. By default, the power level is 100%. Therefore, even if you enable the automatic power, the power of the RF signal will not decrease. The power level is a percentage of the maximum transmission power for the RF signal.

APSD Mode: Select Enable to enable Automatic Power Save Delivery (APSD), which is a power management method. APSD is recommended if VoIP phones access the network through the AP.

RF Scan Interval: This field controls the length of time between channel changes during the RF Scan.

Long Retries The value in this field indicates the maximum number of transmission attempts on frame sizes greater than the RTS Threshold. The range is 1-255.

Rate Limiting: Enabling multicast and broadcast rate limiting can improve overall network performance by limiting the number of packets transmitted across the network. This feature is disabled by default.

Note: The available rate limit values are very low for most environments, so enabling this feature is not recommended except for advanced users.

- To enable Multicast and Broadcast Rate Limiting, click Enabled.
- To disable Multicast and Broadcast Rate Disabled, click **Disabled**.
| DWC-1000 | SETUP | ADVANCED | TOOLS | STATUS |
|------------------------|-------------------------|------------------------------|------------------------------|--------------|
| Global 🔸 | | | | |
| Peer Controllers | AP PROFILES SUMMAR | Y | | LOGOUT |
| AP Profile | This case costains save | al fields that are not scale | the for the default AD Drofi | _ |
| SSIDs | Submit | Dee's Save Satis | | · c · |
| WIDS Security | Submit | Don't save setting | • | |
| Captive Portal | AP Profile Radio Config | uration | | |
| Cilent | AP Profile: | AP F | rofile 1-Default | |
| Application Rules | Radio Mode: | ۲ | 1-802.11a/n | |
| Website Filter | | 0 | 2-802.11b/g/n | |
| Firewall Settings | Radio Configuration | | | |
| IPv6 ► | State: | ۲ | 00 | |
| Advanced Network | | 0 | orr | |
| Routing + | RTS Threshold: | 23 | 47 (0 to 2347) (B/tes) | |
| Certificates | Lond Balancine | | | |
| Users 🕨 | Load balancing: | | (1 b) 1000 mm | |
| IP/MAC Binding | Load Utilization: | 00 | (1 (6 100) (%) | |
| Radius Settings | Maximum Clients: | 20 | 0 (0 to 200) (Seconds) | |
| Switch Settings | RF Scan Other Chanr | iels: 🔽 | | |
| Intel [®] AMT | RF Scan Sentry: | | | |
| | Mode: | | EE 802.11a/n 🚽 | |
| | DTIM Period: | 10 | (1 to 255) (# Beacons | 0 |
| | Beacon Interval: | 10 | 0 (20 to 2000) (Msecs) | |
| | Automatic Channel: | v | | |
| | Automatic Power: | 1 | | |
| | Initial Power: | 10 | 0 (1 to 100) (%) | |
| | APSD Mode | En | able 🔶 | |
| | RF Scan Interval (se | (3) 60 | (30 to 120) | |

Transmit Lifetime: Shows the number of milliseconds to wait before terminating attempts to transmit the MSDU after the initial transmission.

Rate Limit: Enter the rate limit you want to set for multicast and broadcast traffic. The limit should be greater than 1, but less than 50 packets per second. Any traffic that falls below this rate limit will always conform to and be transmitted to the appropriate destination. The default and maximum

rate limit setting is 50 packets per second. This field is disabled if Rate Limiting is disabled.

Receive Lifetime: Shows the number of milliseconds to wait before terminating attempts to reassemble the MMPDU or MSDU after the initial reception of a fragmented MMPDU or MSDU.

Rate Limit Burst: Setting a rate limit burst determines how much traffic bursts can be before all traffic exceeds the rate limit. This burst limit allows intermittent bursts of traffic on a network above the set rate limit. The default and maximum rate limit burst setting is 75 packets per second. This field is disabled if Rate Limiting is disabled.

Station Isolation: When this option is selected, the AP blocks communication between wireless clients. It still allows data traffic between its wireless clients and wired devices on the network, but not among wireless clients. This feature is disabled by default.

- To enable Multicast and Broadcast Rate Limiting, click Enabled.
- To disable Multicast and Broadcast Rate Disabled, click Disabled.

Channel Bandwidth: The 802.11n specification allows the use of a 40-MHz-wide channel in addition to the legacy 20-MHz channel available with other modes. The 40-MHz channel enables higher data rates but leaves fewer channels available for use by other 2.4 GHz and 5 GHz devices. The 40-MHz option is enabled by default for 802.11a/n modes and 20 MHz for 802.11b/g/n modes. You can use this setting to restrict the use of the channel bandwidth to a 20-MHz channel.

Primary Channel: This setting is editable only when a channel is selected and the channel bandwidth is set to 40 MHz. A 40-MHz channel can be considered to consist of two 20-MHz channels that are contiguous in the frequency domain. These two 20-MHz channels are often referred to as the Primary and Secondary channels. The Primary Channel is used for 802.11n clients that support only a 20-MHz channel bandwidth and for legacy clients. Use this setting to set the Primary Channel as the upper or lower 20-MHz channel in the 40-MHz band.

1					
Frag Threshold (bytes)	2346	(256 to 2346)			
RF Scan Sentry Channels	√ 802	11a 🗸 802.11b/g			
Short Retries	7				
RF Scan Duration (msecs)	10	(10 to 2000)			
Long Retries	4				
Rate Limiting					
Transmit Lifetime (msecs)	512				
Rate Limit (pkts/sec)	50 (1 to 50)			
Receive Lifetime (msecs)	512				
Rate Limit Burst (pkts/sec)	75 (1 to 75)			
Station Isolation					
Channel Bandwidth	40 MHz	-			
Primary Channel	Lower	-			
Protection	Auto				
Short Guard Interval	Enable	-			
Space Time Block Code	Enable	•			
Radio Resource Managemer	Enable	-			
No ACK	Disable	-			
Multicast Tx Rate (Mbps)	Auto				
Channels					
Supported Channels:	6 44 149	157			
Auto Eligible:	V V V	V			
Rate Sets (Mbps):	9 12	18 24	36	48	54
Basic:	V 📃 V				
Supported:	V V V	v	1	1	1
Defeat					

Figure 36: AP Pofile - Radio configuration (Part-2)

Protection: The protection feature contains rules to guarantee that 802.11 transmissions do not cause interference with legacy stations or applications. By default, these protection mechanisms are enabled (Auto). With protection enabled, protection mechanisms will be invoked if legacy devices are within range of the AP. You can disable (Off) these protection mechanisms; however, when 802.11n protection is off, legacy clients or APs within range can be affected by 802.11n transmissions. 802.11 protection is also available when the mode is 802.11b/g. When protection is enabled in this mode, it protects 802.11b clients and APs from 802.11g transmissions.

Short Guard Interval: The guard interval is the dead time, in nanoseconds, between OFDM symbols. The guard interval prevents Inter-Symbol and Inter-Carrier Interference (ISI, ICI). The 802.11n mode allows for a reduction in this guard interval from the a and g definition of 800 nanoseconds to 400 nanoseconds. Reducing the guard interval can yield a 10% improvement in data throughput. Select one of the following options:

- Enable: The AP transmits data using a 400 ns guard Interval when communicating with clients that also support the 400 ns guard interval.
- **Disable**: The AP transmits data using an 800 ns guard interval.

Space Time Block Code: Space Time Block Coding (STBC) is an 802.11n technique intended to improve the reliability of data transmissions. The data stream is transmitted on multiple antennas so the receiving system has a better chance of detecting at least one of the data streams. Select one of the following options:

- **Enable**: The AP transmits the same data stream on multiple antennas at the same time.
- **Disable**: The AP does not transmits the same data on multiple antennas.

Radio Resource Management: Radio Resource Measurement (RRM) mode requires the Wireless System to send additional information in beacons, probe responses, and association responses. Enable or disable the support for radio resource measurement feature in the AP profile. The feature is set independently for each radio and is enabled by default.

No ACK: Select Enable to specify that the AP should not acknowledge frames with QosNoAck as the service class value.

Multicast Tx Rate (**Mbps**): Select the 802.11 rate at which the radio transmits multicast frames. The rate is in Mbps. The lowest rate in the 5 GHz band is 6 Mbps.

SSID Configuration

The SSID Configuration page displays the virtual access point (VAP) settings associated with the selected AP profile. Each VAP is identified by its network number and Service Set Identifier (SSID).

Figure 37: AP Pofile - SSID configuration

DWC-1000		SETUP	ADVANCE	ADVANCED T		ST/	TUS		
Global 🕨									
Peer Controllers	AP P	ROFILES SUMM	ARY				LOGOUT		
AP Profile	This	name displays the y	virtual access point (VAD) settings as	ociated with the	selected AD	nofile. Each		
SSIDs	VAP	VAP is identified by its network number and Service Set Identifier (SSID).							
WIDS Security		Submit	Don't Save S	Settings					
Captive Portal	АР Р	rofile VAP Conf	iguration						
Client	AP	Profile:		AP Profile 1-I	Default				
Application Rules 🕨	Ra	dio Mode:		1-802.11a	a/n				
Website Filter				0 2-802.11	o/g/n				
Firewall Settings	List o	of SSID							
IPv6 🕨		Network	VLAN	L3 Tunnel	Hide SSID	Security	Redirect		
Advanced Network	\checkmark	1-dlink1 🚽	1-default	Disabled	Disabled	None	None		
Routing •		2 - dlink2 🚽	1-default	Disabled	Disabled	None	None		
Certificates		3 - dlink3 🚽	1-default	Disabled	Disabled	None	None		
Users 🕨		4 - dlink4 🚽	1-default	Disabled	Disabled	None	None		
IP/MAC Binding		5-dlink5 🚽	1-default	Disabled	Disabled	None	None		
Radius Settings		6 - dlink6	1-default	Disabled	Disabled	None	None		
Switch Settings			1. defende	Disabled	Disabled	Mana	Nega		
Intel [®] AMT		/-dink/ 🐙		Disabled	Disabled	None	Ivone		
		8 - dlink8 🚽	1-default	Disabled	Disabled	None	None		
		9 - dlink9 🚽	1-default	Disabled	Disabled	None	None		
		10-dlink10 🖕	1-default	Disabled	Disabled	None	None		
		11-dlink11 🖕	1-default	Disabled	Disabled	None	None		

Radio Mode: From this field, you can select the radio that you want to configure. By default, Radio 1 operates in IEEE 802.11a/n mode, and Radio 2 operates in IEEE 802.11b/g/n mode. If you change the mode, the labels for the radios change accordingly. Changes to the settings apply only to the selected radio.The DWL-3600AP is a single-radio AP. Any settings you configure for Radio 1 (802.11a/n) are not applied to the DWL-3600AP. If the selected Hardware Type ID for the AP profile is DWL-3600AP, the radio selectors are not available.

Network: Use the option to the left of the network to enable or disable the corresponding VAP on the selected radio. When enabled, use the menu to select a networks to assign to the VAP. You can configure up to 64 separate networks on the controller and apply them across multiple radio and VAP interfaces. By default, 16 networks are pre-configured and applied in

order to the VAPs on each radio. Enabling a VAP on one radio does not automatically enable it on the other radio.

VLAN: Shows the VLAN ID of the VAP. To change this setting, click Edit.

L3 Tunnel: Shows whether L3 Tunneling is enabled on the network.

Note: When L3 tunneling is enabled, the VLAN ID configured above is not used. In fact, the controller puts the management VLAN ID, if any, on the tunneled packets destined to the AP.

Hide SSID: Shows whether the VAP broadcasts the SSID. If enabled, the SSID for this network is not included in AP beacons. To change this setting, click Edit.

Security: Shows the current security settings for the VAP. To change this setting, click Edit. Redirect Shows whether HTTP redirect is enabled. The possible values for the field are as follows:

- **HTTP**: HTTP Redirect is enabled
- None: HTTP Redirect is disabled

Edit: Click Edit to modify settings for the corresponding network. When you click Edit, the Wireless Network Configuration page appears.

QoS Configuration

Quality of Service (QoS) provides you with the ability to specify parameters on multiple queues for increased throughput and better performance of differentiated wireless traffic, different types of audio, video, and streaming media as well as traditional IP data over the DWC-1000.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	AP PROFILES SUMM	ARY		LOGOUT
AP Profile	Description goes here			
SSIDs	Submit Don't	Save Settings		
WIDS Security				
Captive Portal	AP Profile QoS Conf	iguration		
Client		AP Profile	e 1-Default	
Application Rules	Radio Mode:	۲	1-802.11a/n 🔘 2-802.11	1b/g/n
Website Filter	Template:	Cu	stom 👻	
Firewall Settings	AP EDCA Paramete	215		
IPv6 🕨	Data 0 (Voice)			
Advanced Network	AIFS (msecs)	1		
Routing	cwMin (msecs)	3	•	
Certificates	cwMax (msecs)	7	•	
Users 🕨	Max. Burst (usecs)	150	00	
IP/MAC Binding	Data 1 (Video)			
Radius Settings	AIFS (msecs)	1		
Switch Settings	cwMin (msecs)	7	-	
Intel [®] AMT	cwMax (msecs)	15	▼	
	Max. Burst (usecs)		50	
	Data 2 (Best Effo	ort)		
	AIFS (msecs)	3		
	cwMin (msecs)	15	•	
	cwMax (msecs)	63	~	

Configuring Quality of Service (QoS) on the DWC-1000 consists of setting parameters on existing queues for different types of wireless traffic, and

effectively specifying minimum and maximum wait times (through Contention Windows) for transmission. The settings described here apply to data transmission behavior on the access point only, not to that of the client stations. **AP Enhanced Distributed Channel Access** (EDCA) Parameters affect traffic flowing from the access point to the client station. **Station Enhanced Distributed Channel Access** (EDCA) Parameters affect traffic flowing from the access point. You can specify custom QoS settings, or you can select a template that configures the AP profile with pre-defined settings that are optimized for data traffic or voice traffic.

Radio Mode: From this field, you can select the radio for which you want to configure QoS settings. Settings for each radio are configured separately. By default, Radio 1 operates in IEEE 802.11a/n mode, and Radio 2 operates in IEEE 802.11b/g/n mode. If you change the mode, the labels for the radios change accordingly. Changes to the settings apply only to the selected radio. The DWL--3600AP is a single- radio AP. Any settings you configure for Radio 1 (802.11a/n) are not applied to the DWL--3600AP. If the selected Hardware Type ID for the AP profile is DWL--3600AP, the radio selectors are not available.

Template: Select the QoS template to apply to the AP profile. If you select Custom, you can change the AP and station parameters. If you select Voice or Factory Defaults, the controller will use the pre-defined settings for the template you select.

AP EDCA Parameters:

Queue: Queues are defined for different types of data transmitted from AP-to-station:

- Data 0 (Voice): High priority queue, minimum delay. Time-sensitive data such as VoIP and streaming media are automatically sent to this queue.
- Data 1 (Video): High priority queue, minimum delay. Time-sensitive video data is automatically sent to this queue.
- Data 2 (best effort): Medium priority queue, medium throughput and delay. Most traditional IP data is sent to this queue.

 Data 3 (Background): Lowest priority queue, high throughput. Bulk data that requires maximum throughput and is not time-sensitive is sent to this queue (FTP data, for example).

AIFS (Inter-Frame Space): The Arbitration Inter-Frame Spacing (AIFS) specifies a wait time for dataframes. The wait time is measured in slots. Valid values for AIFS are 1 through 255.

cwMin (**Minimum Contention Window**): This parameter is input to the algorithm that determines the initial random backoff wait time (window) for retry of a transmission. The value specified here in the Minimum Contention Window is the upper limit (in milliseconds) of a range from which the initial random backoff wait time is determined. The first random number generated will be a number between 0 and the number specified here. If the first random backoff wait time expires before the data frame is sent, a retry counter is incremented and the random backoff value (window) is doubled. Doubling will continue until the size of the random backoff value reaches the number defined in the Maximum Contention Window. Valid values for the cwmin are 1, 3, 7, 15, 31, 63, 127, 255, 511, or 1024. The value for cwmin must be lower than the value for cwmax.

cwMax (**Maximum Contention Window**): The value specified here in the Maximum Contention Window is the upper limit (in milliseconds) for the doubling of the random backoff value. This doubling continues until either the data frame is sent or the Maximum Contention Window size is reached. Once the Maximum Contention Window size is reached, retries will continue until a maximum number of retries allowed is reached. Valid values for the cwmax are 1, 3, 7, 15, 31, 63, 127, 255, 511, or 1024. The

value for cwmax must be higher than the value for cwmin.

Max. Burst Length: AP EDCA Parameter Only (The Max. Burst Length applies only to traffic flowing from the access point to the client station.) This value specifies (in milliseconds) the Maximum Burst Length allowed for packet bursts on the wireless network. A packet burst is a collection of multiple frames transmitted without header information. The decreased overhead results in higher throughput and better performance. Valid values for maximum burst length are 0.0 through 999

WMM Mode: Wi-Fi MultiMedia (WMM) is enabled by default. With WMM enabled, QoS prioritization and coordination of wireless medium access is on. With WMM enabled, QoS settings on the DWC-1000 wireless controller control downstream traffic flowing from the access point to client station (AP EDCA parameters) and the upstream traffic flowing from the station to the access point (station EDCA parameters). Disabling WMM deactivates QoS control of station EDCA parameters on upstream traffic flowing from the station to the access point With WMM disabled, you can still set some parameters on the downstream traffic flowing from the access point to the client station (AP EDCA parameters).

- To disable WMM extensions, click **Disabled**.
- To enable WMM extensions, click Enabled

Station EDCA Parameters

Queue: Queues are defined for different types of data transmitted from station-to-AP:

- Data 0 (Voice): High priority queue, minimum delay. Time-sensitive data such as VoIP and streaming media are automatically sent to this queue.
- Data 1 (Video): High priority queue, minimum delay. Time-sensitive video data is automatically sent to this queue.
- Data 2 (best effort): Medium priority queue, medium throughput and delay. Most traditional IP data is sent to this queue.
- Data 3 (Background): Lowest priority queue, high throughput. Bulk data that requires maximum throughput and is not time-sensitive is sent to this queue (FTP data, for example).

AIFS (Inter-Frame Space): The Arbitration Inter-Frame Spacing (AIFS) specifies a wait time for data frames. The wait time is measured in slots. Valid values for AIFS are 1 through 255.

cwMin (**Minimum Contention Window**): This parameter is used by the algorithm that determines the initial random backoff wait time (window) for data transmission during a period of contention for The value specified in the Minimum Contention Window is the upper limit (in milliseconds) of a range from which the initial random backoff wait time is determined. The

first random number generated will be a number between 0 and the number specified here. If the first random backoff wait time expires before the data frame is sent, a retry counter is incremented and the random backoff value (window) is doubled. Doubling will continue until the size of the random backoff value reaches the number defined in the Maximum Contention Window. cwMax (Maximum Contention Window): The value specified in the Maximum Contention Window is the upper limit (in milliseconds) for the doubling of the random backoff value. This doubling continues until either the data frame is sent or the Maximum Contention Window size is reached. Once the Maximum Contention Window size is reached, retries will continue until a maximum number of retries allowed is reached. **TXOP** Limit: Station EDCA Parameter Only (The TXOP Limit applies only to traffic flowing from the client station to the access point.) The Transmission Opportunity (TXOP) is an interval of time when a WME client station has the right to initiate transmissions onto the wireless medium (WM). This value specifies (in milliseconds) the Transmission Opportunity (TXOP) for client stations; that is, the interval of time when a WMM client station has the right to initiate transmissions on the wireless network.

Station EDCA Parameters	
Data 0 (Voice)	
AIFS (msecs)	2
cwMin (msecs)	3 🗸
cwMax (msecs)	7 👻
TXOP Limit (32 usec units)	47
Data 1 (Video)	
AIFS (msecs)	2
cwMin (msecs)	7 🗸
cwMax (msecs)	15 👻
TXOP Limit (32 usec units)	94
Data 2 (Best Effort)	
AIFS (msecs)	3
cwMin (msecs)	15 👻
cwMax (msecs)	1023 👻
TXOP Limit (32 usec units)	0
Data 3 (Background)	
AIFS (msecs)	7
cwMin (msecs)	15 👻
cwMax (msecs)	1023 👻
TYOP Limit (32 user units)	0

Figure 39: AP Pofile - QoS configuration (Part-2)

Chapter 3. Configuring Wireless LAN

3.1 WLAN Setup Wizard

Setup > Wizard > WLAN Setup Wizard

The WLAN Setup Wizard is available for users for configuring the basic wireless controller settings such as radio, SSID and Access Point.

Figure 40: WLAN Setup Wizard



You can start using the Wizard by logging in with the administrator password for the controller. Once authenticated set Country Code that you are located in, and then configure the Radio Configuration, VAP configuration and Acces point. The last step in the Wizard is to click the **Connect** button.

Chapter 4. Monitoring Status and Statistics

4.1 System Overview

The Status page allows you to get a detailed overview of the system configuration. The settings for the wired and wireless interfaces are displayed in the DWC-1000 Status page, and then the resulting hardware resource and controller usage details are summarized on the controller Dashboard.

4.1.1 Dashboard

Status > Dashboard > General

The DWC-1000 dashboard page gives a summary of the CPU and Memory utilization.

Figure 41: Dashboard

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard D				
Global Info 🕨 🕨	DASHBOARD			LOGOUT
Device Info 🔶	This page displays the re- used in form of bar grap	sources being used in the sy hs.	stem currently. This page as	so shows the bandwidth
Access Point Info 🔹 🕨				
LAN Clients Info	CPU Utilization			
Wireless Client Info 🔸	CPU usage by user	: 2%		
VLAN Info	CPU usage by kern	el: 3%		
	CPU idle:	95 %	6	
T co the mass of the	CPU waiting for IO:	. 0 %		
Traffic Monitor	Momony Utilization			
Active Sessions	Memory Oulization			
Active VPNs	Total Memory:	2479	916 KB	
	Used Memory:	2016	576 KB	
	Free Memory:	4624	ЮКВ	
	Cached Memory:	6074	14 KB	
	Buffer Memory:	1714	18 KB	

CPU Utilization

This section displays the router's processor statistics.

CPU usage by user: Percent of the CPU utilization being consumed currently by all user space processes, such as SSL VPN or management operations.

CPU usage by kernel: percent of the CPU utilization being consumed currently by kernel space processes, such as firewall operations.

CPU idle: percent of CPU cycles that are currently not in use.

CPU waiting for IO: percent of CPU cycles that are allocated to input/output devices.

Memory Utilization

This section displays memory status of system.

Total Memory: Indicates total available volatile physical memory.

Used Memory: Indicates memory used by all processes in system.

Free Memory: Indicates available free memory in system.

Cached Memory: Indicates cached memory in system.

Buffer Memory: Indicates buffered memory in system

4.1.2 Device Status

Status > Device Info > Device Status

The DWC-1000 Status page gives a summary of the controller configuration settings configured in the Setup and Advanced menus. The static hardware serial number and current firmware version are presented in the General section. The Option and LAN interface information shown on this page are based on the administrator configuration parameters. The radio band and channel settings are presented below along with all configured and active APs that are enabled on this controller.

Figure	42:	Device	Status	display
--------	-----	--------	--------	---------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard D				
Global Info 🔹 🕨	DEVICE STATUS			LOGOUT
Device Info 🕨	This page displays the o	current settings and displays	a snapshot of the system i	information.
Access Point Info 🕨	General			
LAN Clients Info 🔶	System Name:	DW	C-1000	
Wireless Client Info 🕨	Firmware Version	: 1.01	B41_WW	
Logs 🕨	Serial Number:	QBA	A1AC000073	
Traffic Monitor 🕨	Option1 Information	i.		
Active Sessions	MAC Address:	1A:	00:2B:10:1C:45	
Active VPNs	IPv4 Address:	0.0.0	0.0 / 255.255.255.0	
	IPv6 Address:	fe80	::1800:2bff:fe10:1c45 / 64	4
	Option State:	DO	WN	
	NAT (IPv4 only):	Disa	bled	
	IPv4 Connection T	ype: Dyn	amic IP (DHCP)	
	IPv6 Connection T	ype: Dyn	amic IP (DHCPv6)	
	IPv4 Connection S	tate: Not	Yet Connected	
	IPv6 Connection S	tate: Not	Yet Connected	
	Link State:	LIN	K DOWN	
	Option Mode:	Use	only single Option port:	Option1
	Gateway:	0.0.0	0.0	
	Primary DNS:	0.0.0	0.0	
	Secondary DNS:	0.0.0	0.0	
	Primary DNS(IPv	5):		
	Secondary DNS(IP	v6):		
	Option2 Information			
	MAC Address:	1A:	00:2B:10:1C:46	

Option2 Information	
MAC Address:	1A:00:2B:10:1C:46
IPv4 Address:	0.0.0.0 / 255.255.255.0
IPv6 Address:	fe80::1800:2bff:fe10:1c46 / 64
Option State:	DOWN
NAT (IPv4 only):	Disabled
IPv4 Connection Type:	Dynamic IP (DHCP)
IPv6 Connection Type:	Dynamic IP (DHCPv6)
IPv4 Connection State:	Not Yet Connected
IPv6 Connection State:	Not Yet Connected
Link State:	LINK DOWN
Option Mode:	Use only single Option port: Option1
Gateway:	0.0.0.0
Primary DNS:	0.0.0.0
Secondary DNS:	0.0.0.0
Primary DNS(IPv6):	
Secondary DNS(IPv6):	
LAN Information	
MAC Address:	1A:00:2B:10:1C:44
IP Address:	192.168.10.1 / 255.255.255.0
IPv6 Address:	fe80::1800:2bff:fe10:1c44 / 64, fe80::200:ff:fe00:0 / 64, fec0::1 / 64
DHCP Server:	Enabled
DHCP Relay:	Disabled
DHCPv6 Server:	Disabled

Figure 43: Device Status display (continued)

4.1.3 Wireless LAN AP information

Status > Device Info > Wireless LAN AP Information

The Managed AP status pages allows to access configuration and association information about managed APs and their neighbors.

View AP Details: Shows detailed status information collected from the AP.

View Radio Details: Shows detailed status for a radio interface. Use the radio button to navigate between the two radio interfaces.

View Neighbor APs: Shows the neighbor APs that the specified AP has discovered through periodic RF scans on the selected radio interface.

View Neighbor Clients: Shows information about wireless clients associated with an AP or detected by the AP radio.

View VAP Details: Shows summary information about the virtual access points (VAPs) for the selected AP and radio interface on the APs that the controller manages.

View Distributed Tunneling Details: Shows information about the L2 tunnels currently in use on the AP.

DWC-1000		SETUP	А	DVANCED		TOOLS		STATUS	
Dashboard 🕨 🕨		· · · · ·							
Global Info 🕨 🕨	MAI	NAGED AP STATUS						LO	GOUT
Device Info 🔹 🕨									
Access Point Info 🛛 👂	Sho	wall the details related t	to selec	ted AP.					
LAN Clients Info	List	of Managed APs							
Wireless Client Info 🔸		MAC Address (*) Pe Managed	eer	IP Address	Age	Status	Profile	Radio Interface	
Logs 🕨 🕨		manageu						1-802.11a/n.	
Traffic Monitor		1c:af:f7:1f:24:40	1	192.168.10.101	0d:00:01:33	Managed	1-Default	2-802.11b/g/n	
Active Sessions		1c:bd:b9:95:a6:00) 1	192.168.10.102	0d:00:00:03	Managed	1-Default	1-802.11a/n, 2-802.11b/g/n	
Active VPNs									
		View AP D	etails	s View R	adio Deta	ils V	iew Nei	ghbor APs	
	Vi	View Neighbor Clien View VAP Details View Distributed Tunneling Details							
		Delete All Refresh							

Figure 44: Wireless LAN AP information

MAC Address: The Ethernet address of the contoller managed AP. If the MAC address of the AP is followed by an asterisk (*), it is managed by a peer controller.

IP Address: The network IP address of the managed AP

Age: Time since last communication between the controller and the AP.

Status: The current managed state of the AP. The possible values are:

- **Discovered**: The AP is discovered and by the controller, but is not yet authenticated.
- Authenticated: The AP has been validated and authenticated (if authentication is enabled), but it is not configured.
- **Managed**: The AP profile configuration has been applied to the AP and it's operating in managed mode.
- Failed: The controller lost contact with the AP, a failed entry will remain in the managed AP database unless you remove it. Note that a managed AP will temporarily show a failed status during a reset.
- Note: When management connectivity is lost for a managed AP, then both radios of the AP are turned down. All the clients associated with the AP get disassociated. The radios become operational if and when that AP is managed again by a controller.

Profile: The AP profile configuration currently applied to the managed AP. The profile is assigned to the AP in the valid AP database.

Radio Interface: Shows the wireless radio mode that each radio on the AP is using.

4.1.4 Cluster information

Status > Device Info > Cluster Information

The Peer Controller Status page provides information about other wireless controller in the network.Peer wireless contoreller within the same cluster exchange data about themselves, their managed APs, and clients. The controller maintains a database with this data so you can view information about a peer, such as its IP address and software version. If the controller loses contact with a peer, all of the data for that peer is deleted.

One of the controller in a cluster is elected as a Cluster Controller. The Cluster Controller collects status and statistics from all the other controllers in the cluster, including information about the APs peer controller manage and the clients associated to those APs.

Figure 45: Cluster information

DWC-1000	SETU	JP ADVANCED TOOLS					ST	ATUS				
Dashboard 🕨 🕨												
Global Info D	PEER CONT	ROLLER S	TATUS					LOGOUT				
Device Info 🔶												
Access Point Info	The Peer Co Peer wireless	The Peer Controller status page provides information about other Unified Wireless Controllers in the network. Peer wireless Controllers within the same cluster exchange data about themselves, their managed APs, and clients. The Controller maintains a database with this data so you can view information about a peer, such as its IP address and software version. If the Controller loses contact with a peer, all of the data for that peer is										
LAN Clients Info	clients. The C its IP address											
Wireless Client Info 🔸	deleted.	deleted.										
Logs 🕨	Peer Contro	Peer Controller Status										
Traffic Monitor 🔹 🕨	Cluster C	ontroller IP	Address:	192	2.168.10.3	1						
Active Sessions	Peer Cont	rollers		1	1							
Active VPNs				-								
	List of Peer	Controllers	\$									
	IP Address	Vendor ID	Software Prote Version Vers		I Dis Re	covery eason	Managed AP Count	Age				
	192.168.10.5	10.5 D-Link 4.0.0.1 2 L2 Poll 1						0d:00:01:39				
	Refresh											

Cluster Controller IP Address: IP address of the controller that controls the cluster.

Peer Controllers: Displays the number of peer controllers in the cluster.

IP Address: IP address of the peer wireless controller in the cluster.

Vendor ID: Vendor ID of the peer controller software.

Software Version: The software version for the given peer controllers

Protocol Version: Indicates the protocol version supported by the software on the peer controllers

Discovery Reason: The discovery method of the given peer controller, which can be through an L2 Poll or IP Poll

Managed AP Count: Shows the number of APs that the controller currently manages.

Age: Time since last communication with the contorller in Hours, Minutes, and Seconds.

4.1.5 Resource Utilization

Status > Dashboard > Interface

The Dashboard page presents hardware and usage statistics. The CPU and Memory utilization is a function of the available hardware and current configuration and traffic through the controller. Interface statistics for the wired connections (LAN, Option 1, Option 2/DMZ, VLANs) provide indication of packets through and packets dropped by the interface. Click refresh to have this page retrieve the most current statistics.



Figure 46: Resource Utilization statistics

Interface (L	AN)						
Incoming I	Packets: :		1666	2			
Outgoing F	ackets:		1784	1			
Dropped I	n Packets:		0				
Dropped O	ut Packets	8	0				
Interface (O	Incoming Packets: 16662 Outgoing Packets: 0 Dropped In Packets: 0 Dropped Out Packets: 0 Incoming Packets: 0 Outgoing Packets: 0 Outgoing Packets: 0 Outgoing Packets: 0 Dropped Out Packets: 0 Noropped In Packets: 0 Outgoing Packets: 0 Dropped In Packets: 0 Dropped Out Packets: 0 Outgoing Packets: 0 Dropped Out Packets: 0 Outgoing Packets: 0 Outgoing Packets: 0<						
Incoming I	Packets: :		0				
Outgoing F	ackets:		24				
Dropped I	n Packets:		0				
Dropped O	ut Packets	8	0				
Interface (D	MZ/Option	2)					
Incoming I	Packets:		0				
Outgoing F	ackets:		27				
Dropped I	n Packets:		0				
Dropped O	ut Packets	8	0				
Interface (V	LAN)						
Port Incom	ing Packets	5 Outgoin	g Packets	Dropped In F	Packets D	ropped Out	t Packets
LAN2	0		6	0		0	
WLAN Statis	tics						
	Packe	ts			Byte	25	
Transmitted	Received	Transmit Dropped	Receive Dropped	Transmitted	Received	Transmit Dropped	Receive Dropped
0	0	0	0	0	0	0	0
Active Info							
ICMP Rece	eived:		601				
Active VPI	I Tunnels:		0				
Available	/LANs:		2				
Active Inte	erfaces:		6				

Figure 47: Resource Utilization data (continued)

4.2 Traffic Statistics

4.2.1 Wired Port Statistics

Status > Traffic Monitor > Device Statistics

Detailed transmit and receive statistics for each physical port are presented here. Each interface (Option1, Option 2/DMZ, LAN, and VLANs) have port specific packet level information provided for review. Transmitted/received packets, port collisions, and the cumulating bytes/sec for transmit/receive directions are provided for each interface along with the port up time. If you suspect issues with any of the wired ports, this table will help diagnose uptime or transmit level issues with the port.

The statistics table has auto-refresh control which allows display of the most current port level data at each page refresh. The default auto-refresh for this page is 10 seconds.

Figure	48:	Physical	port	statistics
riguit	чо.	1 nysicai	port	statistics

DWC-1000	SETUP	ADVANO	тос	DLS		STATUS					
Dashboard		The page	will auto-	refresh in 7 s	econds						
Global Info 🔶	DEVICE STATISTICS LOGOUT										
Device Info 🕨	This page shows the Rx/Tx p	acket and b	vte count f	or all the syst	em interf	faces. It a	lso shows the up				
Access Point Info	time for all the interfaces.		·								
LAN Clients Info	System up Time : 0 days,	System up Time : 0 days, 9 hours, 50 minutes, 3 seconds									
Wireless Client Info 🕨	Port Statistics										
VLAN Info	Port	Tx Pkts	Rx Pkts	Collisions	Tx B/s	Rx B/s	Up time				
Logs 🕨	Option1	121	0	0	0	0	Not Yet Available				
Traffic Monitor	Configurable Port (Option)	298	0	0	0	0	Not Yet Available				
Active Sessions Active VPNs	LAN	33972	26089	0	0	0	0 Days 09:48:22				
	Poll Interval: 10 (Seconds) Start Stop										

4.3 Managed AP and Associated Clients Statistics

4.3.1 Managed AP Statistics

Status > Traffic Monitor > Managed AP Statistics

The managed AP statistics page shows information about traffic on the wired and wireless interfaces of the access point. This information can help diagnose network issues, such as throughput problems. The following figure shows the Managed Access Point Statistics page with a managed AP.

MAC Address: This field shows the MAC address of the client station

Interface: This field shows the interface type WLAN or Ethernet.

Packet Transmitted: This field shows the packet transmitted to the client station

Packet Received: This field shows the packet received to the client station

Bytes Transmitted: This field shows the bytes transmitted to the client station

Bytes Received: This field shows the bytes received to the client station

Figure 49: Managed AP Statistics

DWC-1000		SETUP	ADVANC	ED		TOOLS		STATUS			
Dashboard 🕨 🕨											
Global Info 🕨 🕨	MANA	MANAGED AP STATISTICS LOGOUT									
Device Info											
Access Point Info 🛛 🕨	Desci	Description goes here									
LAN Clients Info 🛛 🕨	Clients Info Managed Access Point Statistics										
Wireless Client Info 🔸	mariaş	anaged Access Point Statistics									
Logs 🕨 🕨		MAC Address	Interface		FUCKUU			Dytes	2		
Traffia Monitor				Transm	itted	Received	Trans	mitted	Received		
Traine Womtor			WLAN	3601	9	433	428	5367	129837		
Active Sessions		1c:af:f/:1f:24:40	Ethernet	2279	9	17385	112	0043	1972000		
Active VPNs		View Details View Radio Details View VAP Details									
			-	Kell	C211						

The following actions are supported from this page:

View Details: Shows detailed status information collected from the AP.

View Radio Details: Shows detailed status for a radio interface

View VAP Details: Shows summary information about the virtual access points (VAPs) for the selected AP and radio interface on the APs that the controller manages

Refresh: Updates the page with the latest information

4.3.2 LAN Assoicated Clients

Status > Traffic Monitor > Associated Clients Statistics > LAN Associated Clients

The controller tracks the traffic the client connected wireless controller.

Name: The LAN host name if available through NetBIOS.

IP Address: The LAN device's IP address.

MAC Address: The MAC address of the connected LAN client.

Figure 50: LAN Associated Clients

DWC-1000		SETUP	ļ	ADVANCED	TOOLS		STATUS				
Dashboard 🕨 🕨											
Global Info 🕨 🕨	ASSO	ASSOCIATED CLIENTS STATISTICS LOGOUT									
Device Info 🔹 🕨											
Access Point Info 🛛 🕨	Descri	Description goes here									
LAN Clients Info 🛛 🕨	Associated Clients Statistics										
Wireless Client Info 🕨	10000										
Logs 🕨 🕨		MAC Addre	SS	Transmitted	Trans	mitted	Received				
Traffic Monitor 🛛 🕞	Г	e0:a6:70:8e:b	f:67	4	37	6	84	6664			
Active Sessions											
Active VPNs				Refresh	View Deta	alls					

The following actions are supported from this page:

Refresh: Updates the page with the latest information

View Details: Shows detailed status associated client.

4.3.3 WLAN Assoicated Clients

Status > Traffic Monitor > Associated Clients Statistics > WLAN Associated Clients

The wireless client can roam among APs without interruption in WLAN service. The controller tracks the traffic the client sends and receives during the entire wireless session while the client roams among APs that the controller manages. The controller stores statistics about client traffic while it is associated with a single AP as well as throughout the roaming session.

MAC Address: This field shows the MAC address of the client station

Packet Transmitted: This field shows the packet transmitted to the client station

Packet Received: This field shows the packet received to the client station

Bytes Transmitted: This field shows the bytes transmitted to the client station

Bytes Received: This field shows the bytes received to the client station

Figure 51: WLAN Associated Clients

DWC-1000		SETUP ADVANCED TOOLS STATUS									
Dashboard 🕨											
Global Info 🕨 🕨	ASSO	ASSOCIATED CLIENTS STATISTICS LOGOUT									
Device Info 🔹 🕨											
Access Point Info 🛛 🕨	Descr	Description goes here									
LAN Clients Info	Assoc	iated Clients Sta	tistics								
Wireless Client Info 🕨	10000			Pack	rete		Bytes				
Logs 🕨		MAC Addre	SS	Transmitted	Transmitted Receive		Received				
Traffic Monitor 🛛 🕞	Г	e0:a6:70:8e:b	f:67	4	37	6	84	6664			
Active Sessions				1							
Active VPNs				Refresh	View Deta	ails					

The following actions are supported from this page:

Refresh: Updates the page with the latest information

View Details: Shows detailed status associated client.

4.4 Active Connections

4.4.1 Sessions through the Controller

Status > Active Sessions

This table lists the active internet sessions through the controllers firewall. The session's protocol, state, local and remote IP addresses are shown.

DWC-1000	SETUP	A	DVANCED	<u>т</u> с	DOLS	STATUS					
Dashboard 🕨 🕨											
Global Info 🔶 🕨	ACTIVE SESSIONS	ACTIVE SESSIONS LOGOUT									
Device Info 🔶	This page displays a list of active sessions on your router.										
Access Point Info 🔹 🕨											
LAN Clients Info	Active Sessions	Active Sessions									
Wireless Client Info →	Local		Interne	t	Protocol	State					
VI ANUnfo N	192.168.10.103:350	34	74.125.236	95:80	tcp	ESTABLISHED					
	192.168.1.155:1679	93	192.168.1	2:53	udp	none					
Logs 🕨 🕨	192.168.1.155:1784	16	192.168.1	2:53	udp	none					
Traffic Monitor 🔹 🕨	192.168.10.103:609	39	74.125.236.87:443		tc p	ESTABLISHED					
Active Sessions	192.168.10.103:335	02	74.125.236.83:80		tcp	ESTABLISHED					
Active VPNs	192.168.1.155:1784	46	192.168.1.	16:53	udp	none					
	192.168.10.103:608	83	74.125.236	84:80	tc p	ESTABLISHED					
	192.168.1.155:1679	93	192.168.1.	16:53	udp	none					
	192.168.10.103:520	79	74.125.236.9	93:443	tc p	ESTABLISHED					
	192.168.10.103:461	97	74.125.236.	36:443	tc p	SYN_SENT					
	192.168.10.103:334	99	74.125.236	83:80	tc p	ESTABLISHED					
	192.168.1.155:274	6	192.168.1.	16:53	udp	none					
	192.168.10.103:461	96	74.125.236.	36:443	tc p	SYN_SENT					

Figure 52: List of current Active Firewall Sessions

4.5 LAN Client Info

4.5.1 Associated Clients

Status > LAN Client Info > Associated Clients

The clients that are associated with the APs the controller manages as displayed.

Figure 53: Associated Clients

DWC-1000		SETUP	ADV	ANCED		TOOLS	STAT	STATUS			
Dashboard											
Global Info	ASSO	ASSOCIATED CLIENTS STATUS LOGOUT									
Device Info	v										
Access Point Info	man	You can view a variety of information about the wireless clients that are associated with the APs the controller manages.									
LAN Clients Info	List	of Associate	d Clients								
Wireless Client Info		MAC									
Logs 🕨		Address (*) Peer	MAC Address	AP MAC Address	SSID	BSSID	Detected IP Address	Status			
Traffic Monitor		Associated									
Active Sessions			00:1b:11:1d:fe:2d	1c:af:f7:1f:12:40	udai-1	1c:af:f7:1f:12:50	192.168.10.102	Authenticate			
Active VPNs			00:1b:11:1d:fe:35	1c:af;f7:1f:1b:80	udai-1	1c:af:f7:1f:1b:90	192.168.10.107	Authenticate			
			Disassociate	View Del	tails	View AP De	etails				
	View SSID Details View VAP Details										
		View	Neighbor AP S	itatus Vi	ew Dis	tributed Tunn	eling Status				
				Refr	resh						

MAC Address: The Ethernet address of the client station. If the MAC address is followed by an asterisk (*), the client is associated with an AP managed by a peer controller.

AP MAC Address: The Ethernet address of the AP.

SSID: The network on which the client is connected.

BSSID: The Ethernet MAC address for the managed AP VAP where this client is associated.

Detected IP Address: Identifies the IPv4 address of the client, if available.

Status: Indicates whether or not the client has associated and/or authenticated. The valid values are:

- Associated: The client is currently associated to the managed AP.
- Authenticated: The client is currently associated and authenticated to the managed AP.

• **Disassociated**: The client has disassociated from the managed AP. If the client does not roam to another managed AP within the client roam timeout, it will be deleted.

Disassociate: Disassociates the client from the managed AP.

View Details: For each client associated with an AP that the controller manages, you can view detailed status information about the client and its association with the access point.

View Neighbor Status: The associated client status shows information about access points that the client detects. The information on this page can help you determine the managed AP an associated client might use for roaming.

View Distributed Tunneling Status: The associated client status shows information about access points that the client detects. The AP-AP tunneling mode is used to support L3 roaming for wireless clients without forwarding any data traffic to the wireless controller

View SSID Details: Each managed AP can be from different networks that each have a unique SSID. Although several wireless clients might be connected to the same physical AP, they might not connect by using the same SSID. The WLAN > Monitoring > Client > Associated Clients > SSID Status page lists the SSIDs of the networks that each wireless client associated with a managed AP has used for WLAN access.

View VAP Details: Each AP has set of Virtual Access Points (VAPs) per radio, and every VAP has a unique MAC address (BSSID). This displays the VAP Associated Client Status page which shows information about the VAPs on the managed AP that have associated wireless clients.

4.5.2 LAN Clients

Status > LAN Client Info > LAN Clients

The LAN clients to the controller are identified by an ARP scan through the LAN controller. The NetBios name (if available), IP address and MAC address of discovered LAN hosts are displayed.

Figure 54: List of LAN hosts

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard 🕨 🕨				
Global Info 🔶	LAN CLIENTS			LOGOUT
Device Info 🕨 🕨	This page displays a list of LA	AN clients connected to the rout	ter.	
Access Point Info 🔹 🕨	List of LAN Clients			
LAN Clients Info	Name	IP Address	м	IAC Address
Wireless Client Info 🔸	WORKGROUP	192.168.10.100	F0:	4D:A2:59:28:E1
Logs 🕨				
Traffic Monitor 🔹 🕨				
Active Sessions				
Active VPNs				

4.5.3 Detected Clients

Status > LAN Client Info > Detected Clients

Wireless clients are detected by the wireless system when the clients either attempt to interact with the system or when the system detects traffic from the clients. The Detected Client Status page contains information about clients that have authenticated with an AP as well information about clients that disassociate and are no longer connected to the system.

Figure 55: Detected Clients

DWC-1000		SETUP	ADVANCED	TOOLS	;	STATUS				
Dashboard 🕨 🕨										
Global Info 🕨 🕨	DETE	CTED CLIENT ST	ATUS			LOGOUT				
Device Info										
Access Point Info	The Detected Client Status page contains information about clients that have authenticated with an AP as well information about clients that disassociate and are no longer connected to the system.									
LAN Clients Info	Links									
Wireless Client Info D	LISTO	r Detected Clients	;							
Logs 🕨 🕨		MAC Address	Client Name	Client Status	Age	e Create time				
Traffic Monitor		00:0f:3d:ae:af:bb	0	Detected	0d:00:0	0:18 0d:00:04:27				
Active Sessions		00:11:95:bd:c7:2	3	Detected	0d:00:0	0:18 0d:00:04:27				
Active VPNs		00:17:7c:09:db:1	e	Detected	0d:00:0	4:58 0d:00:04:58				
		00:1b:11:1d:fe:2	7	Detected	0d:00:0	1:19 0d:00:01:19				
		00:1b:11:1d:fe:3	5	Authenticated	0d:00:0	0:01 0d:00:04:58				
		00:1b:11:1d:fe:4	8	Detected	0d:00:0	0:49 0d:00:04:58				
		00:1e:e5:2b:4a:b	9	Detected	0d:00:0	0:49 0d:00:04:27				
		00:22:fb:b3:e9:8	c	Detected	0d:00:0	1:57 0d:00:03:57				

MAC Address: The Ethernet MAC address of the client.

Client Name: Shows the name of the client, if available, from the Known Client Database. If client is not in the database then the field is blank.

Client Status: Shows the client status, which can be one of the following:

- Authenticated. The wireless client is authenticated with the wireless system.
- Detected.The wireless client is detected by the wireless system but is not a security threat.
- Black-Listed.The client with this MAC address is specifically denied access via
- MAC Authentication.
- Rogue.The client is classified as a threat by one of the threat detection algorithms.

Age: Time since any event has been received for this client that updated the detected client database entry.

Create Time: Time since this entry was first added to the detected clients database.

4.6 Access Point

4.6.1 Access Point Status

Status > General > Access Point

The Access Point Status page shows summary information about managed, failed,

and rogue access points the controller has discovered or detected.

Figure 56: AP status

DWG-1000 ///	SETUP	ADVANCED	TOOLS	STATUS
Deshboard D				
Global Info 🔶	ACCESS POINT			LOGOUT
Device Info 🕨	The Assess David Finland		learned be about exceeded to	
Access Point Info 🔹 🕨	points the controller has d	page shows summary in acovered or detected.	formation about managed, ra	aed, and rogue access
LAN Clients Info 💦 🕨	Total Access Points Utili	zation PIE CHART		
Wreless Client Info 🔶				
Logs 🕨				Painta(100%)
Traffic Monitor				
Active Sessions				
Active VPNs				
	Total Access Points Ulif Total Access Points	zation - Data		
	Managed Access Poin	ta: 2		
	Connection Failed Ac	max 0		
	Annua Daiata Hilitaria			
	Standalone Access Dr	sinta: 0		
	Rogue Access Points	. 3		
	Authentication Failed	Access Points: 0		
	Unknown Access Poin	nta: 27		
	Rogue AP Mitigation	Limit: 16		
	Rogue AP Mitigation	Count: 0		
	Maximum Managed Al Group:	Pain Peer 95		
	WLAN Utilization:	19		

Total Access Points Utilization

Total Access Points: Total number of Managed APs in the database. This value is always equal to the sum of Managed Access Points, Connection Failed Access Points, and Discovered Access Points.

Managed Access Points: Number of APs in the managed AP database that are authenticated, configured, and have an active connection with the controller.
Discovered Access Points: APs that have a connection with the controller, but haven't been completely configured. This value includes all managed APs with a Discovered or Authenticated status.

Connection Failed Access Points: Number of APs that were previously authenticated and managed, but currently don't have connection with the controller.

Access Points Utilization

Standalone Access Points: Number of trusted APs in Standalone mode. APs in Standalone mode are not managed by a controller.

Rogue Access Points: Number of Rogue APs currently detected on the WLAN. When an AP performs an RF scan, it might detect access points that have not been validated. It reports these APs as rogues.

Authentication Failed Access Points:

Number of APs that failed to establish communication with the controller.

Unknown Access Points: Number of Unknown APs currently detected on the WLAN. If an AP configured to be managed by the controller is detected through an RF scan at any time that it is not actively managed it is classified as an Unknown AP.

Rogue AP Mitigation Limit: Maximum number of APs for which the system can send de-authentication frames.

Rogue AP Mitigation Count: Number of APs to which the wireless system is currently sending de-authentication messages to mitigate against rogue APs. A value of 0 indicates that mitigation is not in progress.

Maximum Managed APs in Peer Group: Maximum number of access points that can be managed by the cluster.

WLAN Utilization: Total network utilization across all APs managed by this controller. This is based on global statistics.

4.6.2 AP Summary

Status > Access Point Info> APs Summary

The List of AP page shows summary information about managed, failed, and rogue access points the controller has discovered or detected. The status entries can be deleted manually. To clear all APs from the All Access Points status page except Managed Access Points, click **Delete All**.

To configure an Authentication Failed AP to be managed by the controller the next time it is discovered, select the check box next to the MAC address of the AP and\click Manage. You will be presented with the Valid Access Point Configuration page.



DWC-1000		SETUP	ADVANCED		TOOLS	STA	TUS		
Dashboard 🕨 🕨									
Global Info 🛛 🕨	ACCI	CCESS POINTS SUMMARY LOGOUT							
Device Info 🔹 🕨									
Access Point Info 🛛 🖒	Desc	Description goes here							
LAN Clients Info 🛛 🕨	Listo	Liet of A De							
Wireless Client Info 🔸									
Troffic Monitor		MAC Address	IP Address	Age	Status	Radio	Channel		
Trailic Monitor	I	1c:af:f7:1f:24:40	192.168.10.100	Oh:Om:10s	No Database Ent	ry N/A	N/A		
Active Sessions									
		Delete All	Manage Ack	nowledge	View Details	Refres	h		

MAC Address: Shows the MAC address of the access point.

IP Address: The network address of the access point.

Age: Shows how much time has passed since the AP was last detected and the information was last updated.

Status : Shows the access point status

- **Managed**: The AP profile configuration has been applied to the AP and it's operating in managed mode.
- No Database Entry: MAC address of the AP does not appear in the local or RADIUS Valid AP database.
- Authentication (Failed AP): The AP failed to be authenticated by the controller or RADIUS server. Since AP is not configured as a valid AP which the correct local or RADIUS authentication information.
- **Failed**: The controller lost contact with the AP; a failed entry will remain in the managed AP database unless you remove it. Note that a managed AP will temporarily show a failed status during a reset.
- **Rogue**: The AP has not attempted to contact the controller and the MAC address of the AP is not in the Valid AP database.

Radio: Shows the wireless radio mode the AP is using.

Channel: Shows the operating channel for the radio.

The following actions are supported from this page

Delete All: Manually clear all APs from the All Access Points status page except Managed Access Points.

Manage: Configure an Authentication Failed AP to be managed by the controller the next time it is discovered. Select the check box next to the MAC address of the AP before you click Manage You will be presented with the Valid Access Point Configuration page. You can then configure the AP and click Submit to save the AP in the local Valid AP database. If you use a RADIUS server for AP validation, you must add the MAC address of the AP to the AP database on the RADIUS server.

Acknowledge: Identify an AP as an Acknowledged Rogue. Select the check box next to the MAC address of the AP before you click Acknowledge. The controller adds the AP to the Valid AP database as an Acknowledged Rogue.

View Details: To view the details configured APs. Select the check box next to the MAC address of the AP before you click View Details.

Refresh: Updates the page with the latest information

4.6.3 Managed AP Status

Status > Access Point Info> Managed AP Status

In the Managed AP Status page, you can access a variety of information about

each AP that the controller manages.

Figure 58: Managed AP status

DWC-1000		SETUP	ADVANCED		TOOLS			STATUS	
Dashboard 🕨 🕨									
Global Info 🔶 🕨	MAI	NAGED AP STATUS	5						LOGOUT
Device Info 🔹 🕨									
Access Point Info 🛛 🖒	Des	scription goes here							
LAN Clients Info	List	of Managed APs	_						
Wireless Client Info 🔸		MAC Address (*) P	00F						
Traffic Monitor 🔹 🕨		Managed	661	IP Address	Ag	ge	Status	Profile	Radio Interface
Active Sessions		1c:af:f7:1f:24:40		192.168.10.100	0d:00:	00:03	Authenticated	1-Defaul	1-802.11a/n, t 2-802.11b/g/n
		Delete View	AP	Details	View	Radio	Details	View	Neighbor APs
		View Neighbor Clients View VAP Details							
					Refr	esh			

MAC Address: The Ethernet address of the controller-managed AP.

IP Address: The network IP address of the managed AP.

Age: Time since last communication between the Controller and the AP.

Status: The current managed state of the AP. The possible values are

- **Discovered**: The AP is discovered and by the controller, but is not yet authenticated.
- Authenticated: The AP has been validated and authenticated (if authentication is enabled), but it is not configured.

- **Managed**: The AP profile configuration has been applied to the AP and it's operating in managed mode.
- Failed: The Controller lost contact with the AP, a failed entry will remain in the managed AP database unless you remove it. Note that a managed AP will temporarily show a failed status during a reset.

Profile: The AP profile configuration currently applied to the managed AP. The profile is assigned to the AP in the valid AP database.

Radio Interface: Shows the wireless radio mode that each radio on the AP is using.

The following actions are supported from this page:

Delete: Manually clear existing APs

View AP Details: Shows detailed status information collected from the AP.

View Radio Details: Shows detailed status for a radio interface

View Neighbor Details: Shows the neighbor APs that the specified AP has discovered through periodic RF scans on the selected radio interface

View Neighbor Clients: Shows information about wireless clients associated with an AP or detected by the AP radio

View VAP Details: Shows summary information about the virtual access points (VAPs) for the selected AP and radio interface on the APs that the controller manages

4.6.4 Authentication Failure Status

Status > Access Point Info> Authentication Failure Status

An AP might fail to associate to the controller due to errors such as invalid packet format or vendor ID, or because the AP is not configured as a valid AP with the correct local or RADIUS authentication information The AP authentication failure list shows information about APs that failed to establish communication with the DWC-1000 wireless contorller

The AP can fail due to one of the following reasons:

- No Database Entry: The MAC address of the AP is not in the local Valid AP database or the external RADIUS server database, so the AP has not been validated.
- Local Authentication: The authentication password configured in the AP did not match the password configured in the local database.
- Not Managed: The AP is in the Valid AP database, but the AP Mode in the local database is not set to Managed.
- **RADIUS Authentication**: The password configured in the RADIUS client for the RADIUS server was rejected by the server.
- RADIUS Challenged: The RADIUS server is configured to use the Challenge-Response authenticationmode, which is incompatible with the AP.
- **RADIUS Unreachable**: The RADIUS server that the AP is configured to use is unreachable.
- Invalid RADIUS Response: The AP received a response packet from the RADIUS server that was not recognized or invalid.
- Invalid Profile ID: The profile ID specified in the RADIUS database may not exist on the controller. This can also happen with the local database when the configuration has been received from a peer controller.
- **Profile Mismatch** -Hardware Type: The AP hardware type specified in the AP Profile is not compatible with the actual AP hardware.

Figure 59: Authentication Failure Status

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Dashboard 🕨 🕨								
Global Info 🔶 🕨	AP AUTHENTICATION	PAUTHENTICATION FAILURE STATUS LOGOUT						
Device Info								
Access Point Info 🛛 🗅	The AP authentication failure list shows information about APs that failed to establish communication with the Unified Wireless Controller.							
LAN Clients Info								
Wireless Client Info 🔸	List of Authentication F	-allure APS	Lost Failure Turn	1				
Logs 🕨 🕨	MAC Address	IP Address	Last Failure Type	Age				
Traffic Monitor 🔹 🕨	1c:af:f7:1f:24:40) 192.168.10.200	No Database Entry	0d:00:05:42				
Active Sessions	Dele	ete Al Manage V	iew Details Refr	esh				
Active VPNs								

MAC Address: The Ethernet address of the AP. If the MAC address of the AP is followed by an asterisk (*), it was reported by a peer controller.

IP Address: The IP address of the AP.

Last Failure Type: Indicates the last type of failure that occurred, which can be one of the following:

- Local Authentication
- No Database Entry
- Not Managed
- RADIUS Authentication
- RADIUS Challenged
- RADIUS Unreachable
- Invalid RADIUS Response
- Invalid Profile ID
- Profile Mismatch-Hardware Type

Age: Time since failure occurred.

4.6.5 AP RF Scan Status

Status > Access Point Info> AP RF Scan Status

The radios on each AP can periodically scan the radio frequency to collect information about other APs and wireless clients that are within range. In normal operating mode the AP always scans on the operational channel for the radio.

MAC Address: The Ethernet MAC address of the detected AP. This could be a physical radio interface or VAP MAC.

SSID: Service Set ID of the network, which is broadcast in the detected beacon frame.

Physical Mode: Indicates the 802.11 mode being used on the AP.

Channel: Transmit channel of the AP.

Status: Indicates the managed status of the AP, whether this is a valid AP known to the controller or a Rogue on the network. The valid values are:

- Managed: The neighbor AP is managed by the wireless system.
- **Standalone**: The AP is managed in standalone mode and configured as a valid AP entry (local or RADIUS).
- **Rogue**: The AP is classified as a threat by one of the threat detection algorithms.
- Unknown: The AP is detected in the network but is not classified as a threat by the threat detection algorithms.

Age: Time since this AP was last detected in an RF scan. Status entries for the RF Scan Status page are collected at a point in time and eventually age out. The age value for each entry shows how long ago the controller recorded the entry.

Figure 60: AP RF Scan Status

DWC-1000	SETUP		ADVANCED	TOOLS		STATUS	
Dashboard 🕨							
Global Info 🛛 🕨	AP R	F SCAN STATUS					LOGOUT
Device Info 🔹 🕨							
Access Point Info 🛛 þ	APs S	ummary					
LAN Clients Info 🛛 🕨	Mana	ged AP Status	ed APs				
Wireless Client Info 🕨	Authe	ntication Failure	SSID	Physical Mode	Channel	Status	Age
Logs 🕨	AP RE	Scan Status	netgear-1	802.11b/g	1	Unknown	0d:00:00:10
Traffic Monitor 🛛 🕨	AP De	-Authentication	FVS318N_1	802.11b/g	2	Unknown	0d:00:00:10
Active Sessions	Attack	Status	FVS318N_1	802.11b/g	1	Unknown	0d:00:00:10
Active VPNs		00:0e:8e:20:09:4d	rlinxprosoft0	802.11b/g	1	Unknown	0d:00:00:10
		00:0e:8e:20:10:b5	rlinxprosoft0	802.11b/g	1	Unknown	0d:00:00:10
		00:12:21:12:21:16	cisco_wc	802.11b/g	1	Unknown	0d:00:00:10
		00:15:62:ff:cf:46	rv220_1	802.11b/g	1	Unknown	0d:00:00:10
		00:18:e7:89:a9:d0	DSR-1000N_1	802.11b/g	1	Unknown	0d:00:00:10
		00:1b:2f:fd:ff:58	NETGEAR WGR614	802.11b/g	11	Unknown	0d:00:02:10
		00:1e:2a:b3:20:b1	srxnlite	802.11b/g	1	Unknown	0d:00:00:10

4.7 Global Info

4.7.1 Global status

Status > Global Info > Global Status

The DWC-1000 controller periodically collects information from the APs it manages and from associated peer controller. The information on the Global page shows status and statistics about the controller and all of the objects associated with it.

Figure 61: Global Status (Part 1)

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard 🕨 🕨				
Global Info D	SUMMARY			LOGOUT
Device Info	The information on the Global associated with it.	l page shows status	and statistics about the Controller a	nd all of the objects
LAN Clients Info	General			
Wireless Client Info 🕨	WLAN Controller Opera	tional Status:	Enabled	
_ogs ►	IP Address:		192.168.10.1	
raffic Monitor	Peer Controllers:		0	
Active Sessions	Cluster			
	Cluster Controller:		Yes	
	Cluster Controller IP Ad	dress:	192.168.10.1	
	Access Points		192.100.10.1	
	Total Access Points		2	
	Managed Access Points.	e ·	2	
	Standalone Access Point	nte.	0	
	Barrus Assoss Points	into.	•	
	Discovered Access Points.	inte -	0	
	Connection Eailed Access	nus.	0	
		coece Dointe	0	
		ccess Points:	46	
	Dorwo AD Mitiration Lin	5. 	40	
	Rogue AP Mitigation Lin	nn:	10	
	Rogue AP Miligation Co	o in Deer Crown	0	
		s in Peer Group:	30	
			1/ %	
	Clients			
	Total Clients:		0	
	Authenticated Clients:		0	
	802.11a Clients:		0	
	802.11b/g Clients:		0	
	802.11n Clients:		0	

Figure 62: Global Status (Part 2)

Maximum Entries:	Pre-authe	ntication His	tory 500)			
Total Pre- Entries:	authenticat	0					
Maximum	Maximum Roam History Entries:						
Total Roa	m History E	Entries:	0				
WLAN Statis	stics						
	Pac	kets		Bytes			
Transmitted	Received	Transmit Dropped	Receive Dropped	Transmitted	Received	Transmit Dropped	Receive Dropped
21299	351	0	0	1616128	58183	0	0
Distributed	Tunneling						
Distribute Transmitt	ed Tunnel Pa ted:	ackets	0				
Distribute	ed Tunnel R	oamed Clien	nts: 0				
Distribute	Distributed Tunnel Clients:						
Distribute	d Tunnel C	lient Denials	: 0				
			Refresh	Clear Sta	}		

WLAN Controller Operational Status: This status field displays the operational status of this controller (a WLAN controller). The WLAN Controller may be configured as enabled, but is operationally disabled due to configuration dependencies. If the operational status is disabled, the reason will be displayed in the following status field.

IP Address: IP address of the controller.

Peer Controller: Number of peer WLAN controllers detected on the network.

Cluster Controller: Indicates whether this controller is the Cluster Controller for the cluster.

Cluster Controller IP Address: The IP address of the peer controller that is the Cluster Controller.

Total Access Points: Total number of Managed APs in the database. This value is always equal to the sum of Managed Access Points, Connection Failed Access Points, and Discovered Access Points.

Managed Access Points: Number of APs in the managed AP database that are authenticated, configured, and have an active connection with the controller.

Standalone Access Points: Number of trusted APs in Standalone mode. APs in Standalone mode are not managed by a controller.

Rogue Access Points: Number of Rogue APs currently detected on the WLAN. When an AP performs an RFscan, it might detect access points that have not been validated. It reports these APs as rogues.

Discovered Access Points: APs that have a connection with the controller, but haven't been completely configured. This value includes all managed APs with a Discovered or Authenticated status.

Connection Failed Access Points: Number of APs that were previously authenticated and managed, but currently don't have connection with the Unified Controller.

Authentication Failed Access Points: Number of APs that failed to establish communication with the Unified Controller.

Unknown Access Points: Number of Unknown APs currently detected on the WLAN. If an AP configured to be managed by the Unified Controller is detected through an RF scan at any time that it is not actively managed it is classified as an Unknown AP. **Rogue AP Mitigation Limit**: Maximum number of APs for which the system can send de-authentication frames.

Rogue AP Mitigation Count: Number of APs to which the wireless system is currently sending the authentication messages to mitigate against rogue APs. A value of 0 indicates that mitigation is not in progress.

Maximum Managed APs in Peer Group: Maximum number of access points that can be managed by the cluster.

WLAN Utilization: Total network utilization across all APs managed by this controller. This is based on global statistics.

Total Clients: Total number of clients in the database. This total includes clients with an Associated, Authenticated, or Disassociated status.

Authenticated Clients: Total number of clients in the associated client database with an Authenticated status.

802.11a Clients: Total number of IEEE 802.11a only clients that are authenticated.

802.11b/g Clients: Total number of IEEE 802.11b/g only clients that are authenticated.

802.11n Clients: Total number of clients that are IEEE 802.11n capable and are authenticated. These include IEEE 802.11a/n, IEEE 802.11b/g/n, 5 GHz IEEE 802.11n, 2.4GHz IEEE 802.11n.

Maximum Associated Clients: Maximum number of clients that can associate with the wireless system. This is the maximum number of entries allowed in the Associated Client database.

Detected Clients: Number of wireless clients detected in the wireless network environment.

Maximum Detected Clients: Maximum number of clients that can be detected by the controller. The number is limited by the size of the Detected Client Database.

Maximum Pre-authentication History Entries: Maximum number of Client PreAuthentication events that can be recorded by the system.

Total Preauthentication History: Entries Current number of pre-authentication history entries in use by the system.

Maximum Roam History Entries: Maximum number of entries that can be recorded in the roam history for all detected clients.

Total Roam History Entries: Current number of roam history entries in use by the system.

AP Provisioning Count: Current number of AP provisioning entries configured on the system.

WLAN Bytes Transmitted: Total bytes transmitted across all APs managed by the controller.

WLAN Packets Transmitted: Total packets transmitted across all APs managed by the controller.

WLAN Bytes Received Total bytes received across all APs managed by the controller.

WLAN Packets Received: Total packets received across all APs managed by the controller.

WLAN Bytes Transmit Dropped: Total bytes transmitted across all APs managed by the controller that were dropped.

WLAN Packets Transmit Dropped: Total packets transmitted across all APs managed by the controller that were dropped.

WLAN Bytes Receive Dropped: Total bytes received across all APs managed by the controller that were dropped.

WLAN Packets Receive Dropped: Total packets received across all APs managed by the controller that were dropped.

Distributed Tunnel Packets Transmitted: Total number of packets sent by all APs via distributed tunnels.

Distributed Tunnel Roamed Clients: Total number of clients that successfully roamed away from Home AP using distributed tunneling.

Distributed Tunnel Clients: Total number of clients that are associated with an AP that are using distributed tunneling.

Distributed Tunnel Client Denials: Total number of clients for which the system was unable to set up a distributed tunnel when client roamed

The following actions are supported from this page:

Refresh: Updates the page with the latest information.

Clear Statistics: Reset all counters on the page to zero

4.7.2 Peer Contorller Status

Status > Global Info > Peer Controller > Status

The Peer Controller Status page provides information about other Wireless Controllers in the network. Peer wireless controllers within the same cluster exchange data about themselves, their managed APs, and clients. The controller maintains a database with this data so you can view information about a peer, such as its IP address and software version. If the controller loses contact with a peer, all of the data for that peer is deleted. One controller in a cluster is elected as a Cluster Controller. The Cluster Controller collects status and statistics from all the other controllers in the cluster, including information about the APs peer controllers manage and the clients associated to those APs.

Cluster Controller IP Address: IP address of the controller that controls the cluster.

Peer Controllers: Displays the number of peer controller in the cluster.

List of Peer Controllers

IP Address: IP address of the peer wireless controller in the cluster.

Vendor ID: Vendor ID of the peer controller software.

Software Version: The software version for the given peer controller.

Protocol Version: Indicates the protocol version supported by the software on the peer controller.

Discovery Reason: The discovery method of the given peer controller, which can be through an L2 Poll or IP Poll

Managed AP Count: Shows the number of APs that the controller currently manages.

Age: Time since last communication with the controller in Hours, Minutes, and Seconds.

Figure 63: Peer Controller Status

DWC-1000	SETU	Р	ADVAN	ICED	TOOLS	ST	ATUS	
Dashboard 🕨 🕨								
Global Info D	PEER CONT	PEER CONTROLLER STATUS LOGOUT						
Device Info 🔶 🕨		The Peer Controller Status page provides information about other Unified Wireless Controllers in the network. Peer wireless Controllers within the same cluster exchange data about themselves, their managed APs, and clients. The Controller maintains a database with this data so you can view information about a peer, such as its IP address and software version. If the Controller loses contact with a peer, all of the data for that peer is deleted.						
Access Point Info	The Peer Cor Peerwirekess							
LAN Clients Info	clients. The C its IP address							
Wireless Client Info 🔸	deleted.							
Logs 🕨	Peer Control	ler Status						
Traffic Monitor 🛛 🕨	Cluster Co	ontroller IP	Address:	192	2.168.10.1			
Active Sessions	Peer Cont	rollers		1				
Active VPNs				-				
	List of Peer (Controllers	;					
	IP Address	Vendor ID	Software Version	Protoco Version	I Discovery Reason	Managed AP Count	Age	
	192.168.10.5	D-Link	4.0.0.1	2	L2 Poll	1	0d:00:01:39	
	Refresh							

The following actions are supported from this page

Refresh: Updates the page with the latest information

4.7.3 Peer Controller Configuration Status

Status > Global Info > Peer Controller > Configuration

You can push portions of the controller configuration from one controller to another controller in the cluster. The Peer Controller Configuration Status page displays information about the configuration sent by a peer controller in the cluster. It also identifies the IP address of each peer controller that received the configuration information

Peer IP Address: Shows the IP address of each peer wireless controller in the cluster that received configuration information.

Configuration Controller IP Address: Shows the IP Address of the controller that sent the configuration information.

Configuration: Identifies which parts of the configuration the controller received from the peer controller.

Timestamp: Shows when the configuration was applied to the controller. The time is displayed as UTC time and therefore only useful if the administrator has configured each peer controller to use NTP.

Figure 64: Peer Controller Configuration Status

DWC-1000	SETU	Р	٨D٧	ANCED	TOOLS	s	TATUS
Dashboard 🕨 🕨							
Global Info D	PEER CONTR		DNFIGUR	ATION STATUS	S		LOGOUT
Device Info 🔶 🕨							
Access Point Info 🛛 🕨	The Peer Controller Configuration Status page displays information about the configuration sent by a peer Controller in the cluster.						
LAN Clients Info							
Wireless Client Info 🕨	Connected P	eer Control	lers				
Logs	Peer IP Address	Configu Control Addre	ration Iler IP ess		Configuration		Timestamp
Active Sessions	192.168.10.5	192.168.10.5 192.168.10.1 Global, Channel/Power, AP Database, AP Profiles, Known Client, Wds Group, Device Location, RADIUS Client Configuration, QoS ACL Nov 16 13:28:32 2011					
				Ref	resh		

The following actions are supported from this page

Refresh: Updates the page with the latest information

4.7.4 Peer Controller Managed AP Status

Status > Global Info > Peer Controller > Managed AP

The Peer Controller Managed AP Status page displays information about the APs that each peer controller in the cluster manages. Use the menu above the table to select the peer controller with the AP information to display. Each peer controller is identified by its IP address

MAC Address: Shows the MAC address of each AP managed by the peer controller.

Peer Controller IP: Shows the IP address of the peer controller that manages the AP. This field displays when "All" is selected from the drop-down menu.

Location: The descriptive location configured for the managed AP.

AP IP Address: The IP address of the AP.

Profile: The AP profile applied to the AP by the controller.

Hardware ID: The Hardware ID associated with the AP hardware platform

Figure 65: Peer Controller Managed AP Status

DWC-1000	SETUP	ADVANCED	то	DLS	STATUS			
Dashboard 🕨 🕨	-							
Global Info D	PEER CONTROLLER M	PEER CONTROLLER MANAGED AP STATUS LOGOUT						
Device Info 🔶 🕨								
Access Point Info	The Peer Controller Mana the cluster manages.	ged AP Status page o	displays information at	out the APs that	at each peer Controller in			
LAN Clients Info								
Wireless Client Info 🔸	Controller							
Logs 🕨	Controller		192.168.10.1	~				
Traffic Monitor 🔹 🕨	Peer Controller Manage	ed AP Status						
Active Sessions	MAC Address	Location	AP IP Address	Profile	Hardware ID			
Active VPNs	1c:bd:b9:95:a6:00		192.168.10.101	1 - Defau	lt hw_dw18600			
			Refresh					

4.7.5 IP Discovery

Status > Global Info > IP Discovery

The IP Discovery list can contain the IP addresses of peer contorllers and APs for the wireless controller to discover and associate with as part of the WLAN

IP Address: Shows the IP address of the device configured in the IP Discovery list.

Status: The status is in one of the following states:

• Not Polled: The controller has not attempted to contact the IP address in the L3/IP Discovery list.

- Polled: The controller has attempted to contact the IP address.
- Discovered: The controller contacted the peer controller or the AP in the L3/IP Discovery list and has authenticated or validated the device.
- Discovered Failed: The controller contacted the peer controller or the AP with IP address in the L3/IP Discovery list and was unable to authenticate or validate the device.

Note: If the device is an access point, an entry appears in the AP failure list with a failure reason.

Figure 66: IP Discovery

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Dashboard 🕨 🕨								
Global Info D	IP DISCOVERY			LOGOUT				
Device Info				i di mali di ka				
Access Point Info	The IP Discovery Status page shows information about communication with the devices in the IP discovery list on the Set up > AP Management > Poll List page.							
LAN Clients Info	In Discovery							
Wireless Client Info 🕨								
1		IP Address		Status				
Logs V		192.168.10.200		Polled				
Traffic Monitor		192.168.10.201		Polled				
Active Sessions		192.168.10.202		Polled				
Active VPNs		Re	efresh					

4.7.6 Configuration Receive Status

Status > Global Info > Config Receive Status

The Peer Controller Configuration feature allows you to send the critical wireless configuration from one controller to all other controllers. In addition to keeping the controllers synchronized, this function enables the administrator to manage all wireless controllers in the cluster from one controller. The Peer Controller Configuration Received Status page provides information about the configuration a controller has received from one of its peers **Current Receive Status:** Indicates the global status when wireless configuration is received from a peer controller. The possible status values are as follows:

- Not Started
- Receiving Configuration
- Saving Configuration,
- Applying AP Profile Configuration
- Success
- Failure Invalid Code Version
- Failure Invalid Hardware Version
- Failure Invalid Configuration

Last Configuration Received: Peer controller IP Address indicates the last controller from which this controller received any wireless configuration data.

Configuration: Indicates which portions of configuration were last received from a peer controller, which can be one or more of the following:

- Global
- Discovery
- Channel/Power
- AP Database
- AP Profiles
- Known Client
- Captive Portal
- RADIUS Client
- QoS ACL
- QoS DiffServ

If the controller has not received any configuration for another controller, the value is **None**.

Timestamp: Indicates the last time this controller received any configuration data from a peer controller. The Peer Controller Managed AP Status page displays information about the APs that each peer controller in the cluster manages. Use the menu above the table to select the peer controller with the AP information to display. Each peer controller is identified by its IP address

Figure 67: Configuration Receive Status



4.7.7 AP Hardware Capability

Status > Global Info > AP H/W Capability

The controller can support APs that have different hardware capabilities, such as the supported number of radios, the supported IEEE 802.11 modes, and the software image required by the AP. From the AP Hardware Capability tab, you can access summary information about the AP Hardware support, the radios and IEEE modes supported by the hardware, and the software images that are available for download to the APs

Hardware Type: Identifies the ID number assigned to each AP hardware type. The controller supports up to six different AP hardware types.

Hardware Type Description: Includes a description of the platform and the supported IEEE 802.11 modes.

Radio Count: Specifies whether the hardware supports one radio or two radios.

Image Type: Specifies the type of software the hardware requires.

Figure	68:	AP	Hardware	Capability
--------	-----	----	----------	------------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Dashboard 🕨								
Global Info D	AP HARDWARE CAPA	AP HARDWARE CAPABILITY LOGOUT						
Device Info								
Access Point Info	From the AP Hardware Capability page, you can access summary information about the AP Hardware support, the radios and IEEE modes supported by the hardware, and the software images that are available for							
LAN Clients Info	download to the APs.	download to the APs.						
Wireless Client Info 🕨	List of Hardware Cap	abilities Supported by	APs					
Logs 🕨	Hardware Type	Hardware Type De	scription Radio C	ount Image Type				
Traffic Monitor		DWL-8600AP Dual Rad	lio a/b/g/n					
Active Sessions								
Active VPNs								

4.8 Wireless Client Status

4.8.1 Client Status

Status > Dashboard > Client

This page shows information about all the clients which are connected through our managed AP.

Figure 69: Client Status

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard D				
Giabad Info 🕴	CLIENT STASTICS			LOGOUT
Device Info 🕴	This same above before a	the sheet of the state of		
Access Point Info 🔹 🕨	The page shows arothe	TON ADOLE AS THE CRIPTS WIT	ch are connected through	our managed AP.
LAN Clients Info 💦 🕨	802.11 Clients BAR Gra	ph		
Wreless Client Info 🔶	2.0			802.11b/g Clients :0
Logs 🔸				802.11n Clients :0
Traffic Monitor	1.5			
Active Sessions				
Active VPNs	No.of Clients 1.0			
	0.5			
		Types of City		
	m // Climba Data	.,		
	BIT He Climber			
	802.11b/g Clients:	2		
	802.11n Clients:	0		
	Clients - Data			
	Total Clients:	2		
	Authenticated Client	a: 2		
	Maximum Associated	Clients: 200		
	Detected Clients:	o		
	Maximum Detected C	lients: 0		
	Maximum Pre-authen Entries:	tication History 1600	1	
	Total Pre-authentical Entries:	tion History 0		
	Maximum Roam Hist	ory Entries: 500		
	Total Roam History 5	Entries: 0		

802.11 Clients – Data

802.11a Clients: Total number of IEEE 802.11a only clients that are authenticated.

802.11b/g Clients: Total number of IEEE 802.11b/g only clients that are authenticated.

802.11n Clients: Total number of clients that are IEEE 802.11n capable and are

authenticated. These include IEEE 802.11a/n, IEEE 802.11b/g/n, 5 GHz IEEE 802.11n, 2.4GHz IEEE 802.11n.

Clients – Data

Total Clients: Total number of clients in the database. This total includes clients with an Associated, Authenticated, or Disassociated status.

Authenticated Clients: Total number of clients in the associated client database with an Authenticated status.

Maximum Associated Clients: Maximum number of clients that can associate with the wireless system. This is the maximum number of entries allowed in the Associated Client database.

Detected Clients: Number of wireless clients detected in the WLAN.

Maximum Detected Clients: Maximum number of clients that can be detected by the controller. The number is limited by the size of the Detected Client Database.

Maximum Pre-authentication History Entries: Maximum number of Client Pre-Authentication events that can be recorded by the system.

Total Pre-authentication History Entries: Current number of pre-authentication history entries in use by the system.

Maximum Roam History Entries: Maximum number of entries that can be recorded in the roam history for all detected clients.

Total Roam History Entries: Current number of pre-authentication history entries in use by the system.

4.8.2 Assocaited Client Status

Status > Wireless Client Info>Associated Clients > Status

You can view a variety of information about the wireless clients that are associated with the APs the controller manages.

MAC Address: The Ethernet address of the client station. If the MAC address is followed by an asterisk (*), the client is associated with an AP managed by a peer controller.

AP MAC Address: The Ethernet address of the AP.

SSID: The network on which the client is connected.

BSSID: The Ethernet MAC address for the managed AP VAP where this client is associated.

Detected IP Address: Identifies the IPv4 address of the client, if available.

Figure 70: Associated Client Status

DWC-1000	SETUP	AD	VANCED	STATUS					
Dashboard 🕨 🕨									
Global Info 🔶 🕨	ASSOCIATED	ASSOCIATED CLIENTS STATUS LOGOUT							
Device Info 🔶									
Access Point Info	You can view a v manages.	You can view a variety of information about the wireless clients that are associated with the APs the controller manages.							
LAN Clients Info									
Wireless Client Info 🛛 🖒	List of Associat	ted Clients							
Logs 🕨	Address (*)	MAC Address	AP MAC Address	s SSID	BSSID	Detected IP			
Traffic Monitor 🔹 🕨	Associated					Address			
Active Sessions		e4:ec:10:5e:0d:0a	1c:bd:b9:95:a6:00	1111111111111111	1c:bd:b9:95:a6:10	0.0.0.0			
Active VPNs									
		Disassociat	View Det	ails View AP De	etails				
		View	SSID Detail	View VAP Details					
	(n			

The following actions are supported from this page:

Disassociate: Disassociates the selected client from the managed AP.

View Details: Display associated client details.

View AP Details: Display associated AP details.

View SSID Details: Lists the SSIDs of the networks that each wireless client associated with a managed AP has used for WLAN access

View VAP Details: Shows information about the VAPs on the managed AP that have associated wireless clients

View Neighbor AP Status: Shows information about access points that the client detects.

4.8.3 Associated Client SSID Status

Status > Wireless Client Info>Associated Clients > SSID Status

Each managed AP can have up to 16 different networks that each has a unique SSID. Although several wireless clients might be connected to the same physical AP, they might not connect by using the same SSID

SSID: Indicates the network on which the client is connected.

Client MAC Address: The Ethernet address of the client station.



DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard 🕨				
Global Info 🔶 🕨	SSID ASSOCIATE	D CLIENT STATUS		LOGOUT
Device Info 🔹 🕨				
Access Point Info 🛛 🕨	Description goes he	ere		
LAN Clients Info	List of SSID Asso	ciated Clients		
Wireless Client Info ▷		SSID	Client MAC	Address
Logs 🕨 🕨		MARIZUANA	e0:a6:70:8	e:bf:67
Traffic Monitor		1	1	1
Active Sessions	Disa	sociate View Client	Details Refr	esh
Active VPNs				

The following actions are supported from this page:

Disassociate: Disassociates the client from the managed AP.

View Client Details: Display associated client details.

Refresh: Updates the page with the latest information

4.8.4 Associated Client VAP Status

Status > Wireless Client Info>Associated Clients > VAP Status

Each AP has 16 Virtual Access Points (VAPs) per radio, and every VAP has a unique MAC address (BSSID). The VAP Associated Client Status page which shows information about the VAPs on the managed AP that have associated wireless clients. To disconnect a client from an AP, select the box next to the BSSID, and then click Disassociate

BSSID: Indicates the Ethernet MAC address for the managed AP VAP where this client is associated.

SSID: Indicates the SSID for the managed AP VAP where this client is associated.

AP MAC Address: This field indicates the base AP Ethernet MAC address for the managed AP.

Radio: Displays the managed AP radio interface the client is associated to and its configured mode.

Client MAC Address: The Ethernet address of the client station.

Client IP Address: The IP address of the client station.

Figure 72: Associated Client VAP Status

DWC-1000		SETUP	ADVANCED		TOOLS		STATUS	
Dashboard 🕨 🕨								
Global Info 🔶 🕨	VAP	VAP ASSOCIATED CLIENT STATUS						
Device Info 🔶								
Access Point Info	Des	Description goes here						
LAN Clients Info	Liet							
Wireless Client Info 👂	LIST		cu olicinto					
Logs 🕨 🕨		BSSID	SSID	MAC	Radio	MAC	IP	
Traffic Monitor				Address		Address	Address	
Active Sessions		1c:af:f7:1f:24:51	MARIZUANA	1c:af:f7:1f:24:40	2-802.11b/g/n	e0:a6:70:8e:bf:	67 169.254.36.132	
Active VPNs		Disassociate Refresh						

The following actions are supported from this page:

Disassociate: Disassociates the client from the managed AP.

Refresh: Updates the page with the latest information

4.8.5 Controller Associated Client Status

Status > Wireless Client Info> Associated Clients > Controller Status

This shows information about the controller that manages the AP to which the client is associated

Controller IP Address: Shows the IP address of the controller that manages the AP to which the client is associated.

Client MAC Address: Shows the MAC address of the associated client.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard 🕨				
Global Info 🛛 🕨	CONTROLLER ASSOC	IATED CLIENT STATUS		LOGOUT
Device Info				
Access Point Info	Description goes here			
LAN Clients Info	List of Controller Asso	ciated Clients		
Wireless Client Info ▷		Controller IP Address	Client	MAC Address
Logs 🕨		192.168.1.185	e0:a6	5:70:8e:bf:67
Traffic Monitor 🛛 🕨				
Active Sessions	Disa	ssociate View Clier	nt Details Refree	sh l
Active VPNs				

Figure 73: Controller Associated Client Status

The following actions are supported from this page:

Disassociate: Disassociates the client from the managed AP.

View Client Details: Display associated client details.

Refresh: Updates the page with the latest information

4.8.6 Detected Client Status

Status > Wireless Client Info> Detected Clients

Wireless clients are detected by the wireless system when the clients either attempt to interact with the system or when the system detects traffic from the clients. The Detected Client Status page contains information about clients that have authenticated with an AP as well information about clients that disassociate and are no longer connected to the system.

MAC Address: The Ethernet address of the client.

Client Name: Shows the name of the client, if available, from the Known Client Database. If client is not in the database then the field is blank.

Client Status: Shows the client status, which can be one of the following:

- Authenticated: The wireless client is authenticated with the wireless system.
- **Detected**: The wireless client is detected by the wireless system but is not a security threat.
- **Black-Listed**: The client with this MAC address is specifically denied access via MAC Authentication.
- **Rogue**: The client is classified as a threat by one of the threat detection algorithms.

Age: Time since any event has been received for this client that updated the detected client database entry.

Create Time: Time since this entry was first added to the detected client's database.

Figure 74: Detected Client Status

DWC-1000		SETUP		ADVANCED	TOOLS			STATUS
Dashboard 🕨 🕨								
Global Info 🛛 🕨	DETEC	CTED CLIENT ST	ATUS					LOGOUT
Device Info 🛛 🕨								
Access Point Info 🛛 🕨	Descr	iption goes here						
LAN Clients Info 🛛 🕨	Listof	Detected Clients						
Wireless Client Info 👂		botootou onoma						
Logs 🕨 🕨		MAC Addres	s	Client Name	Client Status	Ag	je	Create time
Traffic Monitor		00:07:0e:b3:76	:8d		Detected	0d:00:	02:16	0d:00:17:09
Active Sessions		00:0e:8e:20:10	:a4		Detected	0d:00:	00:15	0d:00:17:09
Active VPNs		00:0f:3d:aa:46	:a9		Detected	0d:00:	03:46	0d:00:03:46
		00:13:02:9a:a7	':bf		Detected	0d:00:	00:46	0d:00:16:10
		00:13:e8:da:22	:85		Detected	0d:00:	00:46	0d:00:17:09
		00:14:d1:c1:f1	36		Detected	0d:00:	12:39	0d:00:13:39

The following actions are supported from this page:

Delete: Delete the selected client from the list. If the client is detected again, it will be added to the list.

Delete All: Deletes all non-authenticated clients from the Detected Client database. As clients are detected, they are added to the database and appear in the list.

Acknowledge All Rogues: Clear the rogue status of all clients listed as rogues in the Detected Client database, The status of an acknowledge client is returned to the status it had when it was first detected. If the detected client fails any of the tests that classify it as a threat, it will be listed as a Rogue again

Refresh: Updates the page with the latest information.

4.8.7 Pre-Authorization History

Status > Wireless Client Info> Pre-Auth History

To help authenticated clients roam without losing sessions and needing to reauthenticate, wireless clients can attempt to authenticate to other APs within range that the client could possibly associate with. For successful pre-authentication, the target AP must have a VAP with an SSID and security configuration that matches that of the client, including MAC authentication, encryption method, and preshared key or RADIUS parameters. The AP that the client is associated with captures all pre-authentication requests and sends them to the controller.

MAC Address: MAC address of the client.

AP MAC Address: MAC Address of the managed AP to which the client has preauthenticated.

Radio Interface Number: Radio number to which the client is authenticated, which is either Radio 1 or Radio 2.

VAP MAC Address: VAP MAC address to which the client roamed.

SSID: SSID Name used by the VAP.

Age: Time since the history entry was added.

User Name: Indicates the user name of client that authenticated via 802.1X.

Pre-Authentication Status: Indicates whether the client successfully authenticated and shows a status of Success or Failure.



DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard 🕨 🕨				
Global Info 🛛 🕨	DETECTED CLIENT PR		STORY SUMMARY	LOGOUT
Device Info				
Access Point Info 🛛 🕨	Description goes here			
LAN Clients Info	Detected Client Pre-Au	thentication History		
Wireless Client Info 👂		No presuthentication b	istony entries to display	
Logs 🕨 🕨		no preautientication-n	istory entries to display.	
Traffic Monitor		Ref	resh	
Active Sessions				
Active VPNs				

This page includes the following button:

Refresh: Updates the page with the latest information.

4.8.8 Detected Client Roam History

Status > Wireless Client Info> Roam History

The wireless system keeps a record of clients as they roam from one managed AP to another managed AP.

MAC Address: MAC address of the detected client.

AP MAC Address: MAC Address of the managed AP to which the client authenticated.

Radio Interface Number: Radio Number to which the client is authenticated.

VAP MAC Address: VAP MAC address to which the client roamed.

SSID SSID Name used by the VAP.

New Authentication: A flag indicating whether the history entry represents a new authentication or a roam event.

Age: Time since the history entry was added.

DWC-1000		SETUP		ADVANCED	то	ols	STATUS	
Dashboard 🕨 🕨								
Global Info 🛛 🕨	DET	DETECTED CLIENT ROAM HISTORY LOGOUT						
Device Info 🛛 🕨								
Access Point Info 🛛 🕨	Des	scription goes here						
LAN Clients Info	Dete	ected AP						
Wireless Client Info 🛛 🖒	м	AC Address:		f0:70	d:68:11:7a	:a2		
Logs 🕨 🕨	List	of Detected Client	s Roan	n History				
Traffic Monitor		AP MAC Address	Radio	VAP MAC Address	SSID	Status	Time Since Event	
Active Sessions		1c:af:f7:1f:1d:40	2	1c:af:f7:1f:1d:51	dwc-naren	New Authentication	0d:00:01:53	
Active VPNs		1c:af:f7:1f:20:c0	2	1c:af:f7:1f:20:d1	dwc-naren	Roam	Od:00:08:59	
		1c:af:f7:1f:1d:40	2	1c:af:f7:1f:1d:51	dwc-naren	New Authentication	0d:00:12:34	
		1c:af:f7:1f:1d:40	2	1c:af:f7:1f:1d:51	dwc-naren	Roam	0d:00:20:55	
		1c:af:f7:1f:20:c0	2	1c:af:f7:1f:20:d1	dwc-naren	New Authentication	0d:00:23:55	
			Ref	resh Purge H	History V	iew Details		

Figure 76: Detected Client Roam History

This page includes the following button:

Refresh: Updates the page with the latest information.

Purge History: To purge the history when the list of entries is full.

View Details: Shows the details of the detected clients.

Chapter 5. AP Management

The AP Management contains links to the following pages that help you manage and maintain the APs on your DWC-1000 wireless controller network:

- Valid Access Point Configuration
- RF Management
- Access Point Software Download
- Local OUI Database
- AP Provisioning
- Manual Management

5.1 Valid Access Point Configuration

Setup > AP Management > Valid AP

MAC Address This field shows the MAC address of the AP. To change this field, you must delete the entire Valid AP configuration and then enter the correct MAC address from the page that lists all Valid AP's

Location: To help you identify the AP, you can enter a location. This field accepts up to 32 alphanumeric characters

AP Mode You can configure the AP to be in one of three modes:

- Standalone: The AP acts as an individual access point in the network.
- **Managed**: If an AP is in Managed Mode, the Administrator Web UI and SNMP services on the AP are disabled.
- **Rogue**: Select Rogue as the AP mode if you wish to be notified (through an SNMP trap, if enabled) when this AP is detected in the network.

Profile: If you configure multiple AP Profiles, you can select the profile to assign to this AP

DWC-1000 SETUP ADVANCED TOOLS STATUS Wizard Þ WLAN Global Settings LOGOUT VALID AP AP Management D WLAN Visualization 🕨 Description goes here ... Internet Settings ► List of Valid APs Network Settings MAC Address Location AP Mode Profile Γ QoS Þ 1c:af:f7:1f:24:40 mani Managed 1-Default VLAN Settings ₽ DMZ Setup Þ 00:00:00:00:00:00 MACAddress USB Settings Edit Delete Add

Figure 77: Valid Access Point Configuration

The following actions are supported from this page:

Edit: To edit AP details in Valid AP page.

Delete: To delete a valid AP provide valid MAC address in Valid AP page.

Add: To add an AP in Valid AP page.

Figure 78: Add a Valid Access Point

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	VALID AP			LOGOUT
AP Profile				
WIDS Security	Description goes here			
Captive Portal 🕨 🕨	Submit	Don't Save Setti	ngs	
Client				
Application Rules 🛛 🕨	Valid Access Point Cor	nfiguration		
Website Filter	MAC address:	٥٥ 🍾	:00:00:00:00:08	
Firewall Settings	AP Mode:	M	lanaged 😂	
IPv6 🕨	Location:	ad	dmin)
Advanced Network 🕨	Authentication Pass	word:		Edit
Routing >	5 (1)			
Certificates	Profile:	1	- Default 😳	
Users 🕨	Expected SSID:			
IP/MAC Binding	Expected Channel:	A	ny	
Radius Settings	Expected WDS Mode	: A	nv	
Controller Settings				
en e	Expected Security M	ode: A	ny	

MAC Address: This field shows the MAC address of the AP. To change this field, you must delete the entire Valid AP configuration and then enter the correct MAC address from the page that lists all Valid APs.

AP Mode: You can configure the AP to be in one of three modes:

• **Standalone**: The AP acts as an individual access point in the network. You do not manage the AP by using the controller. Instead, you log on to the AP itself and manage it by using the Administrator Web User Interface (UI), CLI,
or SNMP. If you select the Standalone mode, the screen refreshes and different fields appear. For Standalone mode the following fields are enabled Expected SSID, Expected Channel, Expected WDS Mode, Expected Security Mode and Expected Wired Network Mode.

- **Managed**: The AP is part of the D-Link Wireless Controller, and you manage it by using the Wireless Controller. If an AP is in Managed Mode, the Administrator Web UI and SNMP services on the AP are disabled.
- **Rogue**: Select Rogue as the AP mode if you wish to be notified (through an SNMP trap, if enabled) when this AP is detected in the network. Additionally, the when this AP is detected through an RF scan, the status is listed as Rogue. If you select the Rogue mode, the screen refreshes, and fields that do not apply to this mode are hidden.

Location: To help you identify the AP, you can enter a location. This field accepts up to 32 alphanumeric characters.

Authentication Password: You can require that the AP authenticate itself with the controller upon discovery. Edit option and enter the password in this field. The valid password range is between 8 and 63 alphanumeric characters. The password in this field must match the password configured on the AP.

Profile: If you configure multiple AP Profiles, you can select the profile to assign to this AP

Expected SSID: Enter the SSID that identifies the wireless network on the standalone AP.

Expected Channel: Select the channel that the standalone AP uses. If the AP is configured to automatically select a channel, or if you do not want to specify a channel, select Any

Expected WDS Mode: Standalone APs can use a Wireless Distribution System (WDS) link to communicate with each other without wires. The menu contains the following options:

- **Bridge**: Select this option if the standalone AP you add to the Valid AP database is configured to use one or more WDS links.
- Normal: Select this option if the standalone AP is not configured to use any WDS links.

• Any: Select this option if the standalone AP might use a WDS link.

Expected Security Mode: Select the option to specify the type of security the AP uses:

- Any: Any security mode
- Open: No security
- WEP: Static WEP or WEP 802.1X
- WPA/WPA2: WPA and/or WPA2 (Personal or Enterprise)

Expected Wired Network Mode: If the standalone AP is allowed on the wired network, select Allowed. If the AP is not permitted on the wired network, select Not Allowed

Channel: The Channel defines the portion of the radio spectrum that the radio uses for transmitting and receiving. The range of channels and the default channel are determined by the Mode of the radio interface and the country in which the APs operate.

Power: The power level affects how far an AP broadcasts its RF signal. If the power level is too low, wireless clients will not detect the signal or experience poor WLAN performance. If the power level is too high, the RF signal might interfere with other APs within range.

5.2 RF Management

5.2.1 **RF Configuration**

Setup > AP Management > RF Management > RF Configuration

The radio frequency (RF) broadcast channel defines the portion of the radio spectrum that the radio on the access point uses for transmitting and receiving. The range of available channels for an access point is determined by the IEEE 802.11 mode (also referred to as band) of the access point.

The controller contains a channel plan algorithm that automatically determines which RF channels each AP should use to minimize RF interference. When you enable the channel plan algorithm, the controller periodically evaluates the operational channel on every AP it manages and changes the channel if the current channel is noisy

Channel Plan: Each AP is dual-band capable of operating in the 2.4 GHz and 5 GHz frequencies. The 802.11a/n and 802.11b/g/n modes use different channel plans. Before you configure channel plan settings, select the mode to configure.

Channel Plan Mode: This field indicates the channel assignment mode. The mode of channel plan assignment can be one of the following:

- **Fixed Time**: If you select the fixed time channel plan mode, you specify the time for the channel plan and channel assignment. In this mode the plan is applied once every 24 hours at the specified time.
- **Manual**: With the manual channel plan mode, you control and initiate the calculation and assignment of the channel plan. You must manually run the channel plan algorithm and apply the channel plan to the APs.
- Interval: In the interval channel plan mode, the controller periodically calculates and applies the channel plan. You can configure the interval to be from every 6 to every 24 hours. The interval period begins when you click Submit.

Figure 79: RF configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	RF CONFIGURATION			LOGOUT
AP Management 🛛 🗅				
WLAN Visualization 🕨	Description goes here			
Internet Settings 🛛 🕨				
Network Settings 🛛 🕨	Submit Don'	t Save Settings		
QoS 🕨	Channel Configuration			
VPN Settings 🕨 🕨	Channel Plan	(° .	5 GHz (802 11 a/p)	GHz (802 11 b/g/p)
VLAN Settings ▶	Channel Fian.		5 GH2 (002.11 an) < 2.4	- ciriz (002.11 b/g/ii)
DMZ Setup 🕨 🕨	Channel Plan Mode:	C	Fixed Time 🕚 Manual 🕤	Interval
USB Settings	Channel Plan History	y Depth: 5	(0 to 10)	
	Channel Plan Interva	6	(6 to 24) (Hours)	
	Channel Plan Fixed	ſime:	: (Hours) : O (Minute	es)

Channel Plan History Depth: The channel plan history lists the channels the controller assigns each of the APs it manages after a channel plan is applied. Entries are added to the history regardless of interval, time, or channel plan mode. The number you specify in this field controls the number of iterations of the channel assignment.

APs changed in previous iterations cannot be assigned new channels in the next iteration. This history prevents the same APs from being changed time after time.

Channel Plan Interval: If you select the Interval channel plan mode, you can specify the frequency at which the channel plan calculation and assignment occurs. The interval time is in hours, and you can specify an interval that ranges between every 6 hours to every 24 hours.

Channel Plan Fixed Time: If you select the Fixed Time channel plan mode, you can specify the time at which the channel plan calculation and assignment occurs. The channel plan calculation will occur once every 24 hours at the time you specify.

Power Adjustment Mode: You can set the power of the AP radio frequency transmission in the AP profile, the local database or in the RADIUS server. The

power level in the AP profile is the default level for the AP, and the power will not be adjusted below the value in the AP profile. The settings in the local database and RADIUS server always override power set in the profile setting. If you manually set the power, the level is fixed and the AP will not use the automatic power adjustment algorithm. You can configure the power as a percentage of maximum power, where the maximum power is the minimum of power level allowed for the channel by the regulatory domain or the hardware capability.

Manual: In this mode, you run the proposed power adjustments manually from the Manual Power Adjustments page.

Interval: In this mode, the controller periodically calculates the power adjustments and applies the power for all APs. The interval period begins when you click Submit.

Power Adjustment Interval: This field determines how often the controller runs the power adjustment algorithm. The algorithm runs automatically only if you set the power adjustment mode to Interval.

🌤 This setting gets applied to both radios of the AP.

The following actions are supported from this page:

Submit: Updates the controller with the values you enter.

5.2.2 Channel Plan History

Setup > AP Management > RF Management > Channel Plan History

The wireless controller stores channel assignment information for the APs it manages. The Cluster Controller that controls the cluster maintains the channel history information for all controllers in the cluster. On the Cluster Controller, the page shows information about the radios on all APs managed by controllers in the cluster that are eligible for channel assignment and were successfully assigned a new channel.

Channel Plan: The 5 GHz and 2.4 GHz radios use different channel plans, so the controller tracks the channel history separately for each radio. The channel information that displays on the page is only for the radio you select.

Operational Status: This field shows whether the controller is using the automatic channel adjustment algorithm on the AP radios.

Last Iteration: The number in this field indicates the most recent iteration of channel plan adjustments. The APs that received a channel adjustment in previous iterations cannot be assigned new channels in the next iteration to prevent the same APs from being changed time after time.

Last Algorithm Time: Shows the date and time when the channel plan algorithm last ran.

AP MAC Address: This table displays the channel assigned to an AP in an iteration of the channel plan (Location, Radio,Iteration, Channel)

Figure 80: Channel Plan History.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	CHANNEL PLAN HISTO	DRY		LOGOUT
AP Management 🛛 🗅				
WLAN Visualization 🕨	Description goes here			
Internet Settings 🛛 🕨	Channel Plan			
Network Settings 🛛 🕨				
QoS 🕨	Channel Plan:	0	5 GHz (802.11 a/n) ^(C) 2.	4 GHz (802.11 b/g/n)
VPN Settings 🕨 🕨	Channel Plan History			
VLAN Settings 🕨 🕨	Operational Status	Acti	ve	
DMZ Setup 🕨 🕨	Last Iteration	0		
USB Settings	Last Algorithm Time	a lan	1 00:00:00 1970	
	Last Algorithm Thine	5 Jan	1 00.00.00 1970	
	List of Iterations			
		No Channel Plan hist	ory entries exists.	

5.2.3 Manual Channel Plan

Setup > AP Management > RF Management > Manual Channel Plan

If you specify Manual as the Channel Plan Mode on the Configuration tab, the Manual Channel Plan page allows you to initiate the channel plan algorithm. To manually run the channel plan adjustment feature, select the radio to update the channels on (5 GHz or 2.4 GHz) and click Start.

Channel Plan: The 5 GHz and 2.4 GHz radios use different channel plans, so the controller tracks the channel history separately for each radio. The channel information that displays on the page is only for the radio you select.

Channel plan algorithm (Current Status): Shows the Current Status of the plan, which is one of the following states:

- None: The channel plan algorithm has not been manually run since the last controller reboot.
- Algorithm in Progress: The channel plan algorithm is running.
- Algorithm Complete: The channel plan algorithm has finished running.

A table displays to indicate proposed channel assignments. Each entry shows the AP along with the current and new channel. To accept the proposed channel change, click Apply. You must manually apply the channel plan for the proposed assignments to be applied.

- **Apply In Progress**: The controller is applying the proposed channel plan and adjusting the channel on the APs listed in the table.
- Apply Complete: The algorithm and channel adjustment are complete

Proposed Channel Assignments: If no APs appear in the table after the algorithm is complete, the algorithm does not recommend any channel changes.

- **Current Channel**: Shows the current operating channel for the AP that the algorithm recommends for new channel assignments.
- New Channel: Shows the proposed operating channel for the AP.

The following actions are supported from this page:

Start: To initiate the channel plan algorithm

Figure 81: Manual Channel Plan.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	MANUAL CHANNEL P	LAN		LOGOUT
AP Management 🛛 🖒				
WLAN Visualization 🕨	Description goes here			
Internet Settings 🛛 🕨	Channel Plan			
Network Settings 🕨 🕨		5 GHz (802.11 a/n)	C 2.4 GHz (802.11 b/a/n)	
QoS 🕨	Chappel Blap Algorithm		(
VPN Settings 🛛 🕨		1		
VLAN Settings 🕨 🕨	Current Status:	None		
DMZ Setup 🕨		Start		
USB Settings	Proposed Channel Ass	ignments		
		No proposed chann	el plan entries exist.	

5.2.4 Manual Power Adjustment Plan

Setup > AP Management > RF Management > Manual Power Adjustment Plan

If you select Manual as the Power Adjustment Mode on the Configuration tab, you can manually initiate the power adjustment algorithm on the Manual Power Adjustments page.

Current Status: Shows the Current Status of the plan, which is one of the

following states:

- None: The power adjustment algorithm has not been manually run since the last controller reboot.
- Algorithm In Progress: The power adjustment algorithm is running.
- Algorithm Complete: The power adjustment algorithm has finished running.
- A table displays to indicate proposed power adjustments. Each entry shows the AP along with the current and new power levels.
- Apply In Progress: The controller is adjusting the power levels that the APs use.
- Apply Complete: The algorithm and power adjustment are complete. AP MAC Address Identifies the

AP MAC address: Identifies the AP MAC address.

Location: Identifies the location of the AP, which is set in the Valid AP database.

Radio Interface: Identifies the radio.

Old Power: Shows the earlier power level for the AP.

New Power: Shows the proposed power level for the AP.

The following actions are supported from this page:

Start: To initiate the power adjustment algorithm.

Figure 82: Manual Power Adjustment Plan

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	MANUAL POWER A	DJUSTMENTS		LOGOUT
AP Management 🛛 🗅				
WLAN Visualization 🕨	Description goes here			
Internet Settings 🛛 🕨	Power Adjustment A	laorithm		
Network Settings 🕨 🕨				
QoS 🕨	Current Status:		vone	
VPN Settings			tart	
VLAN Settings 🛛 🕨	Proposed Power Ad	ljustments		
DMZ Setup ►	AP MAC Address	ocation Radio Interface Ok	Power New Power	
USB Settings				
	No proposed power a	adjustment entries exist.		

5.3 Access Point Software Download

Setup > AP Management > Software Download

The wireless controller can upgrade software on the APs that it manages.

The AP firmware version must as same as DWC-1000 WLAN module version

Server Address: Enter the IP address of the host where the upgrade file is located. The host must have a TFTP server installed and running.

File Path: Enter the file path on the TFTP server where the software is located. You may enter up to 96 characters.

File Name: Enter the name of the upgrade file. You may enter up to 32 characters, and the file extension .tar must be included.

Group Size: When you upgrade multiple APs, each AP contacts the TFTP server to download the upgrade file. To prevent the TFTP server from being overloaded, you can limit the number of APs to be upgraded at a time. In the

Group Size field, enter the number of APs that can be upgraded at the same time. When one group completes the upgrade, the next group begins the process

Image Download Type: Type of the image to be downloaded, which can be one of the following:

- All images (img_dwl8600 and img_dwl3600/6600)
- img_dw18600
- img_dwl3600/6600

> To download all images, make sure you specify the file path and file name for both images in the appropriate File Path and File Name fields.

Managed AP: The list shows all the APs that the controller manages. If the controller is the Cluster Controller, then the list shows the APs managed by all controllers in the cluster. Each AP is identified by its MAC address, IP address, and Location in the <MAC - IP - Location> format. To upgrade a single AP, select the AP MAC address from the drop down list. To upgrade all APs, select All from the top of the list. If All is selected, the Group Size field will limit the number of simultaneous AP upgrades in order not to overwhelm the TFTP server

Figure	83:	Access	Point	Software	Download
--------	-----	--------	-------	----------	----------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	SOFTWARE DOWNLOA	AD		LOGOUT
AP Management 🛛 🗅				
WLAN Visualization 🕨	Description goes here			
Internet Settings 🛛 🕨				
Network Settings 🕨 🕨				
QoS 🕨	Access Point Software	Download		
VPN Settings 🛛 🕨	Server Address:	0.0	.0.0	
VLAN Settings	File Path:			
DMZ Setup 🕨	File Name:			
USB Settings	Group Size:	10	(1 to 6)	
	Image Download Typ	All	images 💌	
			af:f7:1f:24:40 - 192.168.1	67 -

5.4 Local OUI Database Summary

Setup > AP Management > Local OUI Database

To help identify AP and Wireless Client adapter manufacturers detected in the wireless network, the wireless controller contains a database of registered Organizationally Unique Identifiers (OUIs). This is a read-only list with over 10,000 registrations. From the Local OUI Database Summary page, you can enter up to 64 user-defined OUIs. The local list is searched first, so the same OUI can be located in the local list as well as the read-only list.

OUI Value: Enter the OUI that represents the company ID in the format XX:XX:XX where XX is a hexadecimal number between 00 and FF. The first three bytes of the MAC address represents the company ID assignment.

The first byte of the OUI must have the least significant bit set to 0. For example 02:FF:FF is a valid OUI, but 03:FF:FF is not.

OUI Description: Enter the organization name associated with the OUI. The name can be up to 32alphanumeric characters..

Figure 84: Local OUI Database

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	LOCAL OUI DATABAS	ESUMMARY		LOGOUT
AP Management 🛛 🗅				
WLAN Visualization $~ ightarrow$	Description goes here			
Internet Settings 🛛 🕨				
Network Settings 🕨 🕨	Note: No entries currently exist	t in the Local OUI Database. If de	sired, you can add new OUI entri	85.
QoS 🕨		Delete Delet	e All Refresh	
VPN Settings 🔹 🕨				
VLAN Settings 🕨 🕨	Add to Database			
DMZ Setup	OUI	Value	00:00:	00
USB Settings	OUIDe			
			Add	

5.5 AP Provisioning Summary

Setup > AP Management > AP Provisioning Summary Status

The AP Provisioning feature helps you add new APs to an existing controller cluster. With AP Provisioning, you can configure the access points with parameters that are needed to connect to the wireless network. Use AP Provisioning to connect devices to a network enabled for mutual authentication. If a network is not enabled for mutual authentication then APs can be attached to the network by properly configuring the local Valid AP database or RADIUS AP database and discovery options. The provisioning feature can optionally be used on networks not enabled for mutual authentication to simplify AP attachment to the cluster.

MAC Address: MAC address of the AP

IP Address: IP Address of the AP.

Primary IP Address: The IP address of the primary provisioned controller as reported by the AP.

Backup IP Address: The IP address of the backup provisioned controller as reported by the AP.

New Primary IP Address: Enter the IP address of primary controller to which the AP should try to connect.

New Backup IP Address: Enter the IP address of controller to which the AP should try to connect if it is unable to connect to the primary controller.

Status: Status of the most recently issued AP provisioning command, which has one of the following values:

- Not Started: Provisioning has not been started for this AP.
- **Success**: Provisioning finished successfully for this controller. The AP Provisioning Status table should reflect the latest provisioning configuration.
- In Progress: Provisioning is in progress for this AP.
- **Invalid Controller IP Address**: Either primary or backup controller IP address is not in the cluster or the mutual authentication mode is enabled and the primary controller IP address is not specified.
- **Provisioning Rejected**: AP is not managed and is configured not to accept provisioning data in unmanaged mode.
- **Timed Out**: The last provisioning request timed out.

Figure 85: AP Provisioning Summary Status

DWC-1000	SETUP ADVANCED			TOOLS		STATU	IS	
Wizard 🕨								
WLAN Global Settings	AP PR	IOVISIONING SUI	MMARY STATL	IS				LOGOUT
AP Management 🛛 🗅								
WLAN Visualization 🕨	AP Pr Summ	ovisioning Summary nary and Detail page	/Status page sho s display data on	ws information ly when the c	on about all provis ontroller is config	ioned APs.1 ured as the	The AP Provision Cluster Controlk	ning er.
Option Port Settings ▶								
Network Settings 🛛 🕨		ovicioning Status						
LAN QoS 🕨 🕨		ovisioning status				New		
VLAN Settings 🔹 🕨		MAC Address	IP Address	Primary IP	Backup IP	Primary	New Backup	Status
USB Settings 🕨 🕨		(^)-Managed		Address	Address	Address	IP Address	
	•	1c:af:f7:1f:24:40	192.168.2.100	192.168.10.	1 192.168.10.1		192.168.10.1	Success
	□ •	1c:bd:b9:95:a6:00	192.168.10.101					Not Started
		Delete	e* Delete	Al Provis	sion Edit	Re	fresh	
			* - Only U	nmanaged /	APs can be delet	ed.		

The following actions are supported from this page:

Delete: Remove the selected AP from the AP provisioning list.

Delete All: Remove all APs from the AP provisioning list.

Provision: Initiate provisioning for the selected AP. You can provision an AP only from the cluster controller. After the AP is provisioned, it should become managed by the controller with the configured Primary IP Address and appear in the AP provisioning database as a managed AP.

Edit: Edit the parameters of selected AP from the AP provisioning list

Refresh: Updates the page with the latest information

5.6 Manual Management

Setup > AP Management > Manual Management

When the AP is in Managed mode, remote access to the AP is disabled. From the Manaual Management page, you can also manually change the RF channel and power for each radio on an AP. The manual power and channel changes override the settings configured in the AP profile (including automatic channel selection) and take effect immediately. The manual channel and power assignments are not retained when the AP is reset or if the profile is reapplied to the AP, such as when the AP disassociates and reassociates with the controller.

Figure 86: Manual Management

DWC-1000		SETUP ADVANCED		ED	TOOLS	STATUS		
Wizard 🕨								
WLAN Global Settings	MAN	UAL MANAGEMEN	іт				LOGOUT	
AP Management 🛛 🗅								
WLAN Visualization $~ ightarrow$	AP m on th	nanaged by the Unified ie value in the RADIUS	d Wireless Switch Sor local Valid AF	is listed by olatabase.	its MAC address and loca	tion. The loca	tion is based	
Option Port Settings ▶		/						
Network Settings 🔹 🕨	Listo	of Managed APs		_				
LAN OoS		MAC Address	Location	Debug	Radio Interface	Channel	Power (%)	
		1c:af:f7:1f:24:40		Enabled	1-802.11a/n	44	100	
					2-802.11b/g/n	1	100	
USB Settings ►		1c:bd:b9:95:a6:00		Enabled	1-802.11a/n	157	100	
					2-802.11b/g/n	1	100	
		Managed AP Debug Edit Channel/Power Refresh						

MAC Address: Shows the MAC address of the AP.

Location: Shows the AP location, which is based on the value configured in the RADIUS or local Valid AP database.

Debug: To help you troubleshoot, you can enable Telnet access to the AP so that you can debug the device from the CLI. The Debug field shows the debug status and can be one of the following:

- Disabled
- Set Requested
- Set in Progress
- Enabled

To change the status, select the AP and click the Managed AP Debug button.

Radio Interface: Identifies the radio to which the channel and power settings apply.

Channel: Select the AP and click the Edit Channel/Power button to access the Managed AP Channel/Power Adjust page. From that page, you can set a new channel for Radio 1 or Radio 2. The available channels depend on the radio mode and country in which the APs operate. The manual channel change overrides the channel configured in the AP profile and is not retained when the AP reboots or when the AP profile is reapplied.

Power: Select the AP and click the Edit Channel/Power button to access the Managed AP Channel/Power Adjust page. From that page, you can set a new power level for the AP. The manual power change overrides the power setting configured in the AP profile and is not retained when the AP reboots or when the AP profile is reapplied

Chapter 6. Connecting to the Internet: Option Setup

This contoller has two Option ports that can be used to establish a connection to the internet. The following ISP connection types are supported: DHCP, Static, PPPoE, PPTP, L2TP.

It is assumed that you have arranged for internet service with your Internet Service Provider (ISP). Please contact your ISP or network administrator for the configuration information that will be required to setup the controller.

The ISP Connection types: PPPoE, PPTP, L2TP, NAT/Transparent mode feature are available upon licensed activation of VPN / Firewall features for the system.

6.1 Internet Connection Setup Wizard

Setup > Wizard > Internet

The Internet Connection Setup Wizard is available for users new to networking. By going through a few straightforward configuration pages you can take the information provided by your ISP to get your Option connection up and enable internet access for your network.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS		
Wizard D						
WLAN Global Settings	INTERNET CONNECTIO	N		LOGOUT		
AP Management 🔹 🕨	This page will guide you th	rough common configuration	tasks such as changing the pa	assword, timezone and		
WLAN Visualization 🔸	setting up of your internet	connection.				
Internet Settings	Internet Connection	Setup Wizard				
Network Settings	If you would like to utilize our easy to use Web-based Wizards to assist you in connecting your new D-Link					
LAN QoS	Systems Router to the Int					
VPN Settings		Internet Connect	ion Setup Wizard			
VLAN Settings	Note: Before launching th	ese wizards, please make sur	e you have followed all steps	outlined in the Quick		
DMZ Setup		in the package.				
USB Settings 🕨 🕨	Manual Internet Con	nection Options				
	If you would like to configu the button below.	ure the Internet settings of y	our new D-Link Systems Rout	er manually, then click on		
		Manual Internet (Connection Setup			

Figure 87: Internet Connection Setup Wizard

You can start using the Wizard by logging in with the administrator password for the controller. Once authenticated set the time zone that you are located in, and then choose the type of internet connection type: DHCP, Static, PPPoE, PPTP, L2TP. Depending on the connection type a username/password may be required to register this controller with the ISP. In most cases the default settings can be used if the ISP did not specify that parameter. The last step in the Wizard is to click the Connect button, which confirms the settings by establishing a link with the ISP. Once connected, you can move on and configure other features in this controller.

6.2 **Option Configuration**

Setup > Internet Settings > Option1 Settings > Option1 Setup

You must either allow the controller to detect Option connection type automatically or configure manually the following basic settings to enable Internet connectivity:

Connection type: Based on the ISP you have selected for the primary Option link for this controller, choose Static IP address, DHCP client, Point-to-Point Tunneling Protocol (PPTP), Point-to-Point Protocol over Ethernet (PPPoE), Layer 2 Tunneling Protocol

(L2TP). Required fields for the selected ISP type become highlighted. Enter the following information as needed and as provided by your ISP:

PPPoE Profile Name. This menu lists configured PPPoE profiles, particularly useful when configuring multiple PPPoE connections (i.e. for Japan ISPs that have multiple PPPoE support).

ISP login information. This is required for PPTP and L2TP ISPs.

- User Name
- Password
- Secret (required for L2TP only)

MPPE Encryption: For PPTP links, your ISP may require you to enable Microsoft Pointto-Point Encryption (MPPE).

Split Tunnel (supported for PPTP and L2TP connection). This setting allows your LAN hosts to access internet sites over this Option link while still permitting VPN traffic to be directed to a VPN configured on this Option port.

If split tunnel is enabled, DWC won't expect a default route from the ISP server. In such case, user has to take care of routing manually by configuring the routing from Static Routing page.

To keep the connection always on, click **Keep Connected**. To log out after the connection is idle for a period of time (useful if your ISP costs are based on logon times), click Idle Timeout and enter the time, in minutes, to wait before disconnecting in the Idle Time field.

6.2.1 Option Port IP address

Your ISP assigns you an IP address that is either dynamic (newly generated each time you log in) or static (permanent). The IP Address Source option allows you to define whether the address is statically provided by the ISP or should be received dynamically at each login. If static, enter your IP address, IPv4 subnet mask, and the ISP gateway's IP address. PPTP and L2TP ISPs also can provide a static IP address and subnet to configure, however the default is to receive that information dynamically from the ISP.

6.2.2 Option DNS Servers

The IP Addresses of Option Domain Name Servers (DNS) are typically provided dynamically from the ISP but in some cases you can define the static IP addresses of the DNS servers. DNS servers map Internet domain names (example: www.google.com) to IP addresses. Click to indicate whether to get DNS server addresses automatically from your ISP or to use ISP-specified addresses. If its latter, enter addresses for the primary and secondary DNS servers. To avoid connectivity problems, ensure that you enter the addresses correctly.

6.2.3 DHCP Option

For DHCP client connections, you can choose the MAC address of the controller to register with the ISP. In some cases you may need to clone the LAN host's MAC address if the ISP is registered with that LAN host.

Figure 88: Manual Option1 configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	OPTION1 SETUP			LOGOUT
AP Management 🔹 🕨	This page allows you to se	t up your Internet connection	n. Ensure that you have the	Internet connection
WLAN Visualization 🔸	ISP or network administra	tor.	tion etc. This information is t	isually provided by your
Internet Settings D	Save Settings	Don't Save Setting	s	
Network Settings				
LAN QoS 🕨	Connection Type			
VPN Settings	Connection Type:	Dyr	namic IP (DHCP)	•
VLAN Settings	Host Name:			
DMZ Setup	Domain Name System	(DNS) Servers		
USB Settings	DNS Server Sources	Get	Dynamically from ISP 👻	
	Primary DNS Server	r: 0.0.	0.0	
	Secondary DNS Ser	ver: 0.0.	0.0	
	MAC Address			
	MAC Address Sour	Ce: Use	e Default Address	•
	MAC Address:	00:0	00:00:00:00:00	

6.2.4 **PPPoE**

Setup > Internet Settings > Option1 Settings > Option1 Setup

The PPPoE ISP settings are defined on the Option Configuration page. There are two types of PPPoE ISP's supported by the DWC-1000: the standard username/password PPPoE and Japan Multiple PPPoE.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	OPTION1 SETUP			LOGOUT
AP Management	This page allows you to	set up your Internet connec	tion. Ensure that you have t	the Internet connection
WLAN Visualization 🔸	your ISP or network ad	ministrator.	mation etc. This information	is usually provided by
Internet Settings D	Save Settings	Don't Save Setting	gs	
Network Settings	DDDoE Duofilo Configu	wation		
LAN QoS 🕨	Comparing Trans		D E (U	
VPN Settings	Connection Type:	PF	Pot (Username/Password)	
VLAN Settings	Address Mode:	0	Dynamic IP Static IP	,
DMZ Setup	IP Address:			
USB Settings	IP Subnet Mask:			
	User Name:			
	Password:			
	Service:		(Op	tional)
	Authentication Ty	pe: Au	to-negotiate 👻	
	Reconnect Mode:	۲	Always On 🔘 On Dema	and
	Maximum Idle Tin	ie:		
	Domain Name Syste	m (DNS) Servers		
	DNS Server Source	: Ge	et Dynamically from ISP 🚽	

Figure 89: PPPoE configuration for standard ISPs

Most PPPoE ISP's use a single control and data connection, and require username / password credentials to login and authenticate the DWC-1000 with the ISP. The ISP connection type for this case is "PPPoE (Username/Password)". The GUI will prompt you for authentication, service, and connection settings in order to establish the PPPoE link.

For some ISP's, most popular in Japan, the use of "Japanese Multiple PPPoE" is required in order to establish concurrent primary and secondary PPPoE connections between the DWC-1000 and the ISP. The Primary connection is used for the bulk of data and internet traffic and the Secondary PPPoE connection carries ISP specific (i.e. control) traffic between the DWC-1000 and the ISP.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	OPTION1 SETUP			LOGOUT
AP Management	This page allows you to information such as the I	set up your Internet connec IR Addresses Account Infor	tion. Ensure that you have	the Internet connection
WLAN Visualization 🔸	your ISP or network ad	ministrator.	mation etc. This information	is usually provided by
Internet Settings D	Save Settings	Don't Save Setting	gs	
Network Settings	Primary PPPoE Profil	e Configuration		
LAN QoS	Connection Type:	Ja	panese multiple PPPoF	_
VPN Settings	Address Meder		Dunamic ID 🧼 Static II	
VLAN Settings	Address Plode:	•		r
DMZ Setup	IP Address:			
USB Settings	IP Subnet Mask:			
	User Name:	dlir	ık	
	Password:	••	••••	
	Service:		(Op	otional)
	Authentication Ty	pe: Au	to-negotiate 👻	
	Reconnect Mode:	۲	Always On 🔘 On Dem	and
	Maximum Idle Tim	ne:		
	Primary PPPoE Doma	ain Name System (DNS) Servers	
	DNS Server Source	e: Us	e These DNS Servers 👻]
	Primary DNS Serve	er: 192	2.168.1.2	
	Secondary DNS Se	rver: 192	2.158.1.16	

Figure 90: Option1 configuration for Japanese Multiple PPPoE (part 1)

There are a few key elements of a multiple PPPoE connection:

- Primary and secondary connections are concurrent
- Each session has a DNS server source for domain name lookup, this can be assigned by the ISP or configured through the GUI
- The DWC-1000 acts as a DNS proxy for LAN users

• Only HTTP requests that specifically identify the secondary connection's domain name (for example *.flets) will use the secondary profile to access the content available through this secondary PPPoE terminal. All other HTTP / HTTPS requests go through the primary PPPoE connection.

When Japanese multiple PPPoE is configured and secondary connection is up, some predefined routes are added on that interface. These routes are needed to access the internal domain of the ISP where he hosts various services. These routes can even be configured through the static routing page as well.

Secondary PPPoE Profile Configu	iration
Address Mode:	💿 Dynamic IP 🔘 Static IP
IP Address:	0.0.0.0
IP Subnet Mask:	0.0.0.0
User Name:	dlink
Password:	••••
Service:	(Optional)
Authentication Type:	Auto-negotiate
Reconnect Mode:	Always On On Demand
Maximum Idle Time:	5
econdary PPPoE Domain Name	System (DNS) Servers
DNS Server Source:	Get Dynamically from ISP
Primary DNS Server:	0.0.0
Secondary DNS Server:	0.0.0.0
1ac Address	
MAC Address Source:	Use Default Address
MAC Address	00-00-00-00-00

Figure 91: Option1 configuration for Multiple PPPoE (part 2)

6.2.5 Russia L2TP and PPTP Option

For Russia L2TP Option connections, you can choose the address mode of the connection to get an IP address from the ISP or configure a static IP address

provided by the ISP. For DHCP client connections, you can choose the MAC address of the controller to register with the ISP. In some cases you may need to clone the LAN host's MAC address if the ISP is registered with that LAN host.

Figure 92: Russia L2TP ISP configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global	OPTION1 SETUP			LOGOUT
Settings	This page allows you to	o set up your Internet conne	ection. Ensure that you hav	e the Internet
AP Management 🕨	provided by your ISP of	or network administrator.	ccount mormation etc. m	is mornation is usually
WLAN Visualization >	Save Settings	Don't Save Setting	JS	
Internet Settings				
Network Settings	Connection Type			
LAN QoS	Connection Type:	Ru	issian dual access L2TP	•
VPN Settings	Address Mode:	۲	Dynamic IP 🔘 Static	IP
VLAN Settings	IP Address:			
DMZ Setup	IP Subnet Mask:			
USB Settings	IP Gateway:			
	Server Address:			
	User Name:			
	Password:			
	Secret:			
	Split Tunnel:			
	Reconnect Mode:	۲	Always On 🔘 On De	mand
	Maximum Idle Tim	ne:		
	Domain Name Syster	m (DNS) Servers		
	DNS Server Source	e: Ge	t Dynamically from ISP 🖕	
	Primary DNS Serv	er: 0.0	.0.0	
	Secondary DNS Se	o.0	.0.0	

6.2.6 Option Configuration in an IPv6 Network

Advanced > IPv6 > IPv6 Option1 Config

For IPv6 Option connections, this controller can have a static IPv6 address or receive connection information when configured as a DHCPv6 client. In the case where the ISP assigns you a fixed address to access the internet, the static configuration settings must be completed. In addition to the IPv6 address assigned

to your controller, the IPv6 prefix length defined by the ISP is needed. The default IPv6 Gateway address is the server at the ISP that this controller will connect to for accessing the internet. The primary and secondary DNS servers on the ISP's IPv6 network are used for resolving internet addresses, and these are provided along with the static IP address and prefix length from the ISP.

When the ISP allows you to obtain the Option IP settings via DHCP, you need to provide details for the DHCPv6 client configuration. The DHCPv6 client on the gateway can be either stateless or stateful. If a stateful client is selected the gateway will connect to the ISP's DHCPv6 server for a leased address. For stateless DHCP there need not be a DHCPv6 server available at the ISP, rather ICMPv6 discover messages will originate from this gateway and will be used for auto configuration. A third option to specify the IP address and prefix length of a preferred DHCPv6 server is available as well.

Figure	93:	IPv6	Option1	Setup	page
--------	-----	------	---------	-------	------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	IPV6 OPTION1 CON	FIG		LOGOUT
AP Profile	This page allows user to	IPv6 related WAN1 config	gurations.	
SSIDs	Save Settings	Don't Save Setting]5	
WIDS Security	Internet Address			
Captive Portal	IPv6:	DF	HCPv6 🚽	
Client	Static IP Address			
Application Rules	IPv6 Address:			
Website Filter 🕨	IPv6 Prefix Lengt	64		
Firewall Settings	Default IPv6 Gate	way:		
IPv6 ▷	Primary DNS Serve	er:		
Advanced Network 🕨	Secondary DNS Se	rver:		
Routing	DHCPv6			
Certificates	Stateless Address Configuration:	Auto 💿		
IP/MAC Binding	Stateful Address A Configuration:	uto 💿		
Radius Settings	Enable Prefix Dele	gation		
Controller Settings	PPPoE			
Intel [®] AMT	User Name:	adr	nin	
	Password:		•••	
	Authentication Typ	Au	ito-negotiate 🖕	
	Dhcpv6 Options:	dis	able dhopv6	_
	Primary DNS Serve	er:		
	Secondary DNS Se	rver:		

Prefix Delegation: Select this option to request controller advertisement prefix from any available DHCPv6 servers available on the ISP, the obtained prefix is updated to the advertised prefixes on the LAN side. This option can be selected only in Statesless Address Auto Configuration mode of DHCPv6 Client.

When IPv6 is PPPoE type, the following PPPoE fields are enabled.

Username: Enter the username required to log in to the ISP.

Password: Enter the password required to login to the ISP.

Authentication Type: The type of Authentication in use by the profile: Auto-Negotiate/PAP/CHAP/MS-CHAP/MS-CHAPv2.

Dhcpv6 Options: The mode of Dhcpv6 client that will start in this mode: disable dhcpv6/stateless dhcpv6/stateful dhcpv6/stateless dhcpv6 with prefix delegation.

Primary DNS Server: Enter a valid primary DNS Server IP Address.

Secondary DNS Server: Enter a valid secondary DNS Server IP Address.

Click Save Settings to save your changes.

6.2.7 Checking Option Status

Setup > Internet Settings > Option1 Settings > Option 1 Status

The status and summary of configured settings for both Option 1 and Option 2 are available on the Option Status page. You can view the following key connection status information for each Option port:

MAC Address: MAC Address of the Option port.

IPv4 Address: IP address of the Option port followed by the Option subnet.

Option State: Indicates the state of the Option port (UP or DOWN)

NAT (**IPv4 only**): Indicates if the security appliance is in NAT mode (enabled) or routing mode (disabled).

IPv4 Connection Type: Indicates if the Option IPv4 address is obtained dynamically through a DHCP server or assigned statically by the user or obtained through a PPPoE (Username/Password)/PPTP (Username/Password)/L2TP (Username/Password)/Japanese multiple PPPoE/Russian dual access PPPoE/Russian dual access PPTP/ Russian dual access L2TP ISP connection.

IPv4 Connection State: Indicates if the Option is connected to the Internet Service Provider.

Link State: Detects if a link is present on the Option Interface

Option Mode: Indicates if Option1 or Option2 is in use

Gateway: Gateway IP address of the Option port.

Primary DNS: Primary DNS server IP address of the Option port.

Secondary DNS: Secondary DNS server IP address of the Option port. If the Connection Status indicated that the association with the ISP is active, then the Option can be disconnected by clicking the Disable button.

If the Connection Status indicated that the association with the ISP is active, then the Option can be disconnected by clicking the **Disable** button.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global	OPTION1 STATUS			LOGOUT
Settings	The page provides curre	ent information regarding the	e WAN1 interface. Along w	ith the information a
AP Management			om and pager	
WLAN Visualization >	Option1 Status (IPv4	+)		
Internet Settings D	MAC Address:	1A:0	00:2B:10:1C:45	
Network Settings	IPv4 Address:	0.0.0	0.0 / 255.255.255.0	
LAN QoS	Option State:	DOV	WN	
VPN Settings	NAT (IPv4 only):	Disa	bled	
VLAN Settings	IPv4 Connection T	ype: Dyn	amic IP (DHCP)	
DMZ Setup	IPv4 Connection S	tate: Not	Yet Connected	
	Link State:	LINE	(DOWN	
COD Settings	Option Mode:	Use	only single Option port:	Option1
	Gateway:	0.0.0	0.0	
	Primary DNS:	0.0.0	0.0	
	Secondary DNS:	0.0.0	0.0	
		Renew	Release	
	Ontion 1 Status (TDvf	5)		
	MAC Address:	14:0	0:2B:10:1C:45	
	IPv6 Address:	fe80	::1800:2bff:fe10:1c45/64	
	Option State:	DOV	WN	
	IPv6 Connection T	ype: Dyn	amic IP (DHCP)	
	IPv6 Connection S	tate: Not	Yet Connected	
	Gateway:			
	Primary DNS:			
	Secondary DNS:			

Figure 94: Connection Status information of Option1

The Option status page allows you to Enable or Disable static Option links. For Option settings that are dynamically received from the ISP, you can Renew or Release the link parameters if required.

6.3 Features with Multiple Option Links

This controller supports multiple Option links. This allows you to take advantage of failover and load balancing features to ensure certain internet dependent services are prioritized in the event of unstable Option connectivity on one of the ports.

Setup > Internet Settings > Option Mode

To use Auto Failover or Load Balancing, Option link failure detection must be configured. This involves accessing DNS servers on the internet or ping to an internet address (user defined). If required, you can configure the number of retry attempts when the link seems to be disconnected or the threshold of failures that determines if a Option port is down.

6.3.1 Auto Failover

In this case one of your Option ports is assigned as the primary internet link for all internet traffic. The secondary Option port is used for redundancy in case the primary link goes down for any reason. Both Option ports (primary and secondary) must be configured to connect to the respective ISP's before enabling this feature. The secondary Option port will remain unconnected until a failure is detected on the primary link (either port can be assigned as the primary). In the event of a failure on the primary port, all internet traffic will be rolled over to the backup port. When configured in Auto Failover mode, the link status of the primary Option port is checked at regular intervals as defined by the failure detection settings.

Note that both Option 1 and Option 2 can be configured as the primary internet link.

- Auto-Rollover using Option port
- **Primary Option**: Selected Option is the primary link (Option 1/ Option 2)
- Secondary Option: Selected Option is the secondary link.

Failover Detection Settings: To check connectivity of the primary internet link, one of the following failure detection methods can be selected:

• **DNS lookup using Option DNS Servers**: DNS Lookup of the DNS Servers of the primary link are used to detect primary Option connectivity.

- **DNS lookup using Option Servers**: DNS Lookup of the custom DNS Servers can be specified to check the connectivity of the primary link.
- **Ping these IP addresses**: These IP's will be pinged at regular intervals to check the connectivity of the primary link.
- **Retry Interval is**: The number tells the controller how often it should run the above configured failure detection method.
- Failover after: This sets the number of retries after which failover is initiated.

6.3.2 Load Balancing

This feature allows you to use multiple Option links (and presumably multiple ISP's) simultaneously. After configuring more than one Option port, the load balancing option is available to carry traffic over more than one link. Protocol bindings are used to segregate and assign services over one Option port in order to manage internet flow. The configured failure detection method is used at regular intervals on all configured Option ports when in Load Balancing mode.

DWC-1000 currently supports three algorithms for Load Balancing:

Round Robin: This algorithm is particularly useful when the connection speed of one Option port greatly differs from another. In this case you can define protocol bindings to route low-latency services (such as VOIP) over the higher-speed link and let low-volume background traffic (such as SMTP) go over the lower speed link. Protocol binding is explained in next section.

Spill Over: If Spill Over method is selected, Option 1acts as a dedicated link till a threshold is reached. After this, Option 2 will be used for new connections. You can configure spill-over mode by using folloing options:

- **Load Tolerance**: It is the percentage of bandwidth after which the controller controllers to secondary Option.
- Max Bandwidth: This sets the maximum bandwidth tolerable by the primary Option.

If the link bandwidth goes above the load tolerance value of max bandwidth, the controller will spill-over the next connections to secondary Option.

For example, if the maximum bandwidth of primary Option is 1 Kbps and the load tolerance is set to 70. Now every time a new connection is established the bandwidth increases. After a certain number of connections say bandwidth reached 70% of 1Kbps, the new connections will be spilled-over to secondary Option. The maximum value of load tolerance is 80 and the least is 20.

Protocol Bindings: Refer Section 6.3.3 for details

Load balancing is particularly useful when the connection speed of one Option port greatly differs from another. In this case you can define protocol bindings to route low-latency services (such as VOIP) over the higher-speed link and let low-volume background traffic (such as SMTP) go over the lower speed link. Figure 95: Load Balancing is available when multiple Option ports are configured and Protocol Bindings have been defined

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global	OPTION MODE			LOGOUT
Settings	This page allows user to	o configure the policies on th	e two WAN ports for Inter	net connection.
AP Management >	Save Settings	Don't Save Setting	15	
WLAN Visualization >				
Internet Settings	Port Mode			
Network Settings	Auto-Rollover usin	ng Option port:	Option1 🚽	
LAN QoS 🕨	Load Balancing:	0	Round Robin 🚽	
VPN Settings	Use only single Op	tion port: O	Option1 🚽	
VLAN Settings	Option Failure Detec	tion Method		
DMZ Setup	None:	٢		
USB Settings	DNS lookup using Servers:	Option DNS		
	DNS lookup using	DNS Servers:		
	Option1:	0.0	.0.0	
	Option2:	0.0	.0.0	
	Ping these IP add	resses:		
	Option1:	0.0	.0.0	
	Option2:	0.0	.0.0	
	Retry Interval is:	30	(Seconds)	
	Failover after:	4	(Failures)	
	SPILLOVER CONFIG	URATION		
	Load Tolerance:	80		
	Max Bandwidth:	819	2	

6.3.3 Protocol Bindings
Advanced > Routing > Protocol Bindings

Protocol bindings are required when the Load Balancing feature is in use. Choosing from a list of configured services or any of the user-defined services, the type of traffic can be assigned to go over only one of the available Option ports. For increased flexibility the source network or machines can be specified as well as the destination network or machines. For example the VOIP traffic for a set of LAN IP addresses can be assigned to one Option and any VOIP traffic from the remaining IP addresses can be assigned to the other Option link. Protocol bindings are only applicable when load balancing mode is enabled and more than one Option is configured.

Figure 96: Protocol binding setup to associate a service and/or LAN source to an Option and/or destination network

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	PROTOCOL BINDINGS	i		LOGOUT
AP Profile	This page allows user to	add a new protocol binding	rule for the WAN interfaces	5.
SSIDs	Save Settings	Don't Save Setting	gs	
WIDS Security		P 11		
Captive Portal	Protocol Binding Con	nguration		
Client	Service:	AN	IY ▼	
Application Rules	Local Gateway:	Op	otion1 👻	
Website Filter 🕨 🕨	Source Network:	An	у 🗸	
Firewall Settings	Start Address:			
IPv6 ►	End Address:			
Advanced Network	Destination Netwo	rk: An	у 🗸	
Routing D	Start Address:			
Certificates	End Address:			
Users 🕨				

Service: Select one of the various services available for protocol binding Local Gateway: select the port that sets the local gateway for this protocol binding (either option1 or option2) Source Network: Select one of the following: Any: No specific network needs to be given. Single Address: Limit to one computer. Requires the IP address of the computer that will be part of the source network for this protocol binding Address Range: Select if you want to allow computers within an IP address range to be a part of the source network. Requires Start address and End address **Start Address**: IP address from where the range needs to begin, or the single address if that is the source network selected. End Address: IP address where the range needs to end Destination Network: Select one of the following: Any: No specific network needs to be given. Single Address: Limit to one computer. Requires the IP address of the computer that will be part of the destination network for this protocol binding Address Range: Select if you want to allow computers within an IP address range to be a part of the destination network. Requires Start address and End address Start Address: IP address from where the range needs to begin, or the single

address if that is the destination network selected.

End Address: IP address where the range needs to end

6.4 Routing Configuration

Routing between the LAN and Option will impact the way this controller handles traffic that is received on any of its physical interfaces. The routing mode of the gateway is core to the behaviour of the traffic flow between the secure LAN and the internet.

6.4.1 Routing Mode

Setup > Internet Settings > Routing Mode

This device supports classical routing, network address translation (NAT), and transport mode routing.

• With *classical routing*, devices on the LAN can be directly accessed from the internet by their public IP addresses (assuming appropriate firewall settings). If

your ISP has assigned an IP address for each of the computers that you use, select Classic Routing.

- NAT is a technique which allows several computers on a LAN to share an Internet connection. The computers on the LAN use a "private" IP address range while the Option port on the controller is configured with a single "public" IP address. Along with connection sharing, NAT also hides internal IP addresses from the computers on the Internet. NAT is required if your ISP has assigned only one IP address to you. The computers that connect through the controller will need to be assigned IP addresses from a private subnet.
- **Transparent routing** between the LAN and Option does not perform NAT. Broadcast and multicast packets that arrive on the LAN interface are switched to the Option and vice versa, if they do not get filtered by firewall or VPN policies. To maintain the LAN and Option in the same broadcast domain select Transparent mode, which allows bridging of traffic from LAN to Option and vice versa, except for controller -terminated traffic and other management traffic. All DWC features are supported in transparent mode assuming the LAN and Option are configured to be in the same broadcast domain.
 - NAT routing has a feature called "NAT Hair-pinning" that allows internal network users on the LAN and DMZ to access internal servers (eg. an internal FTP server) using their externally-known domain name. This is also referred to as "NAT loopback" since LAN generated traffic is redirected through the firewall to reach LAN servers by their external name.

Figure 97: Routing Mode is used to configure traffic routing between Option and LAN, as well as Dynamic routing (RIP)

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	ROUTING MODE			LOGOUT
AP Management	This page allows user to o	configure different routing r	nodes like NAT, Classical Ro	uting and Transparent.
WLAN Visualization 🔸	Save Settings	Dee't Save Settier		
Internet Settings	Save Settings	Don't Save Setting	3>	
Network Settings	Routing Mode betwe	en Option and LAN		
LAN QoS	NAT:	0		
VPN Settings	Classical Routing:	۲		
VLAN Settings	Transparent	0		
DMZ Setup	Dynamic Routing (RI	(P)		
USB Settings 🔹 🕨	RIP Direction:	No	ne 🗸	
	RIP Version:	Dis	sabled 👻	
	Authentication for R	IP-2B/2M		
	Enable Authenticat RIP-2B/2M:	tion for		
	First Key Paramete	ers		
	MD5 Key Id:			
	MD5 Auth Key:			
	Not Valid Before:	MN	1 DD YYYY HH	MM SS
	Not Valid After:	MN	1 DD YYYY HH	MM SS
	Second Key Param	eters		

6.4.2 Dynamic Routing (RIP)

The following feature is available upon licensed activation of VPN / Firewall features for the system.

Setup > Internet Settings > Routing Mode

Dynamic routing using the Routing Information Protocol (RIP) is an Interior Gateway Protocol (IGP) that is common in LANs. With RIP this controller can exchange routing information with other supported controllers in the LAN and allow for dynamic adjustment of routing tables in order to adapt to modifications in the LAN without interrupting traffic flow.

The RIP direction will define how this controller sends and receives RIP packets. Choose between:

- **Both**: The controller both broadcasts its routing table and also processes RIP information received from other controllers. This is the recommended setting in order to fully utilize RIP capabilities.
- **Out Only**: The controller broadcasts its routing table periodically but does not accept RIP information from other controllers.
- In Only: The controller accepts RIP information from other controller, but does not broadcast its routing table.
- None: The controller neither broadcasts its route table nor does it accept any RIP packets from other controllers. This effectively disables RIP.
 - The RIP version is dependent on the RIP support of other routing devices in the LAN.
- **Disabled**: This is the setting when RIP is disabled.

RIP-1 is a class-based routing version that does not include subnet information. This is the most commonly supported version.

RIP-2 includes all the functionality of RIPv1 plus it supports subnet information. Though the data is sent in RIP-2 format for both RIP-2B and RIP-2M, the mode in which packets are sent is different. RIP-2B broadcasts data in the entire subnet while RIP-2M sends data to multicast addresses. If RIP-2B or RIP-2M is the selected version, authentication between this controller and other controllers (configured with the same RIP version) is required. MD5 authentication is used in a first/second key exchange process. The authentication key validity lifetimes are configurable to ensure that the routing information exchange is with current and supported controllers detected on the LAN.

6.4.3 Static Routing

Advanced > Routing > Static Routing

Advanced > IPv6 > IPv6 Static Routing

Manually adding static routes to this device allows you to define the path selection of traffic from one interface to another. There is no communication between this controller and other devices to account for changes in the path; once configured the static route will be active and effective until the network changes.

The List of Static Routes displays all routes that have been added manually by an administrator and allows several operations on the static routes. The List of IPv4 Static Routes and List of IPv6 Static Routes share the same fields (with one exception):

Name: Name of the route, for identification and management.

Active: Determines whether the route is active or inactive. A route can be added to the table and made inactive, if not needed. This allows routes to be used as needed without deleting and re-adding the entry. An inactive route is not broadcast if RIP is enabled.

Private: Determines whether the route can be shared with other controllers when RIP is enabled. If the route is made private, then the route will not be shared in a RIP broadcast or multicast. This is only applicable for IPv4 static routes.

Destination: the route will lead to this destination host or IP address.

IP Subnet Mask: This is valid for IPv4 networks only, and identifies the subnet that is affected by this static route

Interface: The physical network interface (Option1, Option2, DMZ or LAN), through which this route is accessible.

Gateway: IP address of the gateway through which the destination host or network can be reached.

Metric: Determines the priority of the route. If multiple routes to the same destination exist, the route with the lowest metric is chosen.

Figure	98:	Static	route	configuration	fields
--------	-----	--------	-------	---------------	--------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	STATIC ROUTE CONFI	GURATION		LOGOUT
AP Profile	This page allows user to a	add a new static route.		
SSIDs	Save Settings	Don't Save Setting	gs	
WIDS Security	Chalie Dauta Carfian			
Captive Portal	Static Route Configu	ration		
Client	Route Name:			
Application Rules	Active:			
Website Filter 🔹 🕨	Private:			
Firewall Settings 🕨	Destination IP Add	ress:		
IPv6 ►	IP Subnet Mask:			
Advanced Network	Interface:	OF	otion1 👻	
Routing D	Gateway IP Addres	55:		
Certificates	Metric:			
Users >				

6.5 OSPF

Advanced > Routing > OSPF

Advanced > IPv6 > OSPF

This page shows the OSPFv2 and OSPFv3 parameters configured on the controller. You can also edit the configured parameters from the OSPF configuration page.

Figure 99: OSPFv2 status - IPv4

DWC-1000		SETUP		ŀ	ADVANCE	D	TOOLS		STATUS
Global 🕨									
Peer Controllers	OSP	FV2							LOGOUT
AP Profile	This	page shows	s the OSPF meters.	Fv2 par	ameters co	nfigured on th	e router.User can	also ed	it the OSPFv2
SSIDs									
WIDS Security	OSP	FV2							
Captive Portal		Interface	Status	Area	Priority	HelloInterva	l DeadInterval	Cost	Authentication Type
Client	V	LAN	Disabled		1	10	40	10	None
Client		Option1	Disabled		1	10	40	10	None
Application Rules		Option2	Disabled		1	10	40	10	None
Website Filter 🕨 🕨									
Firewall Settings						Edit			
IPv6 ►									
Advanced Network									
Routing D									

Figure 100: OSPFv3 status – IPv6

DWC-1000		SETUP	AD	VANCED	TOOLS	STATU	JS
Global 🕨		Please Set IP	Mode to IP	v4/IPv6 in R	outing Mode Page to	configure this page.	
Peer Controllers	OSPE	-V3					LOGOUT
AP Profile	This	name shows the O	PEv3 param	eters configure	d on the router.User ca	n also edit the OSPEv3	
SSIDs	conf	igured parameters		inter of contingent			
WIDS Security	OSPE	-V3					
Captive Portal		Interface	Status	Priority	HelloInterval	DeadInterval	Cost
Client		LAN	Disabled	1	10	40	10
Application Rules		Option1	Disabled	1	10	40	10
Website Filter 🔹 🕨		Option2	Disabled	1	10	40	10
Firewall Settings					Edit		
IPv6 D							

Figure	101:	OSPFv2	Configuration
--------	------	--------	---------------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	OSPFV2 CONFIGURAT	ION		LOGOUT
AP Profile	This page allows the user	to update the configured C	SPFv2 parameters	
SSIDs	Save Settings	Don't Save Setting]5	
WIDS Security				
Captive Portal	Osprv2 Configuration			
Client	Usprvz Enable:	LAN		
Application Rules	Intenace:	LAN		
Website Filter 🕨 🕨	Area:			
Firewall Settings	Priority:	1		
IPv6 ►	Hello Interval:	10		
Advanced Network 🕨	Dead Interval:	40		
Routing D	Cost:	10		
Certificates	Authentication Typ	No No	ne 👻	
Users >	Authentication Key	v:		
IP/MAC Binding				
Radius Settings	Md5 Key Id:			
Switch Settings	Md5 Authenticatio	n Key:		

OSPFv2 Enable: A check box to enable/disable OSPFv2.

Interface: The physical network interface on which OSPFv2 is Enabled/Disabled.

Area: The area to which the interface belongs.Enter values from 1 to 255.Two routers having a common segment; their interfaces have to belong to the same area on that segment. The interfaces should belong to the same subnet and have similar mask.

Priority:Helps to determine the OSPFv2 designated router for a network.The router with the highest priority will be more eligible to become Designated Router. Setting the value to 0, makes the router ineligible to become Designated Router. The default value is 1.Lower value means higher priority.

HelloInterval:The number of seconds for HelloInterval timer value. Setting this value, Hello packet will be sent every timer value seconds on the specified interface.

This value must be the same for all routers attached to a common network. The default value is 10 seconds.

DeadInterval: The number of seconds that a deviceâ€TMs hello packets must not have been seen before its neighbors declare the OSPF router down. This value must be the same for all routers attached to a common network. The default value is 40 seconds. OSPF requires these intervals to be exactly the same between two neighbors. If any of these intervals are different, these routers will not become neighbors on a particular segment

Cost: The cost of sending a packet on an OSPFv2 interface.

Authentication Type: This column displays the type of authentication to be used for OSPFv2.If Authentication type is none the interface does not authenticate ospf packets.If Authentication Type is Simple then ospf packets are authenticated using simple text key.If Authentication Type is MD5 then the interface authenticates ospf packets with MD5 authentication.

Authentication Key: Assign a specific password to be used by neighboring OSPF routers on a network segment that is using Authentication. Routers in the same area that want to participate in the routing domain will have to be configured with the same key.

Md5 Key Id: Input the unique MD-5 key ID to be used by neighboring OSPF routers on a network segment that is using Authentication. Type as MD5

Md5 Authentication Key: Input the auth key for this MD5 key to be used by neighboring OSPF routers on a network segment that is using Authentication Type as MD5

6.6 6to4 Tunneling

Advanced > IPv6 > 6to4 Tunneling

6to4 is an Internet transition mechanism for migrating from IPv4 to IPv6, a system that allows IPv6 packets to be transmitted over an IPv4 network. Select the check box to **Enable Automatic Tunneling** and allow traffic from an IPv6 LAN to be sent over a IPv4 Option to reach a remote IPv6 network.

Figure 102: 6to4 Tunneling

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	6 TO 4 TUNNELING			LOGOUT
AP Profile	This page allows user to	enable/disable the 6 to 4	tunneling.	
SSIDs	Save Settings	Don't Save Settin	gs	
WIDS Security				
Captive Portal 🛛 🕨	Enable Automatic Tu	nneling		
Client	Enable Automatic	Tunneling 🗌		
Application Rules				
Website Filter				
Firewall Settings 🛛 🕨				
IPv6 D				

6.7 IGMP Setup

The following feature is available upon licensed activation of VPN / Firewall features for the system.

Advanced > Advanced Network > IGPM Setup

Active IGMP snooping is referred to as IGMP proxy. When in use IGMP packets through the LAN are filtered in order to reduce the amount of multicast traffic in the network..

Figure 103: IGMP Setup

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS		
Global 🕨		Operation	succeeded			
Peer Controllers 🕨 🕨	IGMP SETUP			LOGOUT		
AP Profile	The IGMP Proxy page alloy	ws the user to enable IGMP n	roxy on a LAN interface			
SSIDs	Save Settinge	Depit Save Setting				
WIDS Security	Save Settings	Save Settings Don't Save Settings				
Captive Portal 🛛 🕨	IGMP Setup					
Client	Enable IGMP Proxy:	Ľ				
Application Rules 🛛 🕨	Allowed Network Addre	sses				
Website Filter 🔹 🕨		etwork Address	Ma	ask Length		
Firewall Settings 🛛 🕨		102 168 20 0		24		
IPv6 🕨		152.100.20.0		24		
Advanced Network 🛛 🖒		Edit Del	ete Add			

Enable IGMP Proxy: Check this to enable IGMP proxy on this LAN

Allowed Network Addresses: All the IP network addresses/host addresses of the multicast sources are listed here.

Network Address: The IP network or the host address of the multicast source.

Mask Length: The length of the subnet mask.

The following actions are supported from this page:

Add: To add a network/host address along with mask length.

Edit: To edit a network/host address along with mask length.

Delete: To delete a network/host address alongwith mask length..

6.8 Option Port Settings

Advanced > Advanced Network > Option Port Setup

The physical port settings for each Option link can be defined here. If your ISP account defines the Option port speed or is associated with a MAC address, this information is required by the controller to ensure a smooth connection with the network.

The default MTU size supported by all ports is 1500. This is the largest packet size that can pass through the interface without fragmentation. This size can be increased, however large packets can introduce network lag and bring down the interface speed. Note that a 1500 byte size packet is the largest allowed by the Ethernet protocol at the network layer.

The port speed can be sensed by the controller when Auto is selected. With this option the optimal port settings are determined by the controller and network. The duplex (half or full) can be defined based on the port support, as well as one of three port speeds: 10 Mbps, 100 Mbps and 1000 Mbps (i.e. 1 Gbps). The default setting is 100 Mbps for all ports.

The default MAC address is defined during the manufacturing process for the interfaces, and can uniquely identify this controller. You can customize each Option port's MAC address as needed, either by letting the Option port assume the current LAN host's MAC address or by entering a MAC address manually.

Figure 104: Physical Option port settings

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	OPTION PORT SETUP			LOGOUT
AP Profile	This page allows user to co	onfigure advanced WAN optic	ons for the router.	
SSIDs	Save Settings	Don't Save Setting	s	
WIDS Security				
Captive Portal	Options Ping			
Client	Respond to Ping:			
Application Rules	Option1 Port Setup			
Website Filter 🕨 🕨	MTU Size:	Det	fault 👻	
Firewall Settings	Custom MTU:	150	00	
IPv6	Port Speed:	Aut	to Sense 👻	
Advanced Network D	Option2 Port Setup			
Routing >	MTU Size:	Det	fault 👻	
Certificates	Custom MTU:	150	00	
Users 🕨	Dant Canada	0.4	- C	
IP/MAC Binding	Port Speed:	Aut	o sense 👻	
Radius Settings				
Controller Settings				
Intel [®] AMT				

6.9 IP Aliases

The following feature is available upon licensed activation of VPN / Firewall features for the system.

Setup > Internet Settings > IP Aliases

The List of IP Aliases displays the configured IP Aliases on the controller.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS			
Wizard 🕨		Operation	succeeded				
WLAN Global Settings							
AP Management 🔹 🕨	IP ALIASES			LOGODI			
WLAN Visualization 🕨	This page displays the configured IP Aliases on Option interfaces.						
Internet Settings 🛛 🗅	List of IP Aliases						
Network Settings 🛛 🕨		Name	IP Address	Subnet Mask			
LAN QoS 🕨 🕨		DN1	192.168.2.1	255.255.255.0			
VPN Settings 🛛 🕨		DN2 1	92.168.11.1	255.255.255.0			
VLAN Settings		Edit Del	ete Add	,			
DM7.Cotup							

Figure 105: IP Aliases

Interface Name: The interface on which the Alias was configured.

IP Address: The IP Address of the configured IP Alias.

Subnet Mask: The Subnet Mask of the configured IP Alias.

The following actions are supported from this page:

Edit: Opens the IP Alias configuration page to edit the selected IP Alias

Add: Opens the IP Alias configuration page to add a new IP Alias.

Delete: Deletes the selected IP Aliases.

Chapter 7. Securing the Private Network

The following feature is available upon licensed activation of VPN / Firewall features for the system.

You can secure your network by creating and applying rules that your controller uses to selectively block and allow inbound and outbound Internet traffic. You then specify how and to whom the rules apply. To do so, you must define the following:

- Services or traffic types (examples: web browsing, VoIP, other standard services and also custom services that you define)
- Direction for the traffic by specifying the source and destination of traffic; this is done by specifying the "From Zone" (LAN/ Option /DMZ) and "To Zone" (LAN/ Option /DMZ)
- Schedules as to when the controller should apply rules
- Any Keywords (in a domain name or on a URL of a web page) that the controller should allow or block
- Rules for allowing or blocking inbound and outbound Internet traffic for specified services on specified schedules
- MAC addresses of devices that should not access the internet
- Port triggers that signal the controller to allow or block access to specified services as defined by port number
- Reports and alerts that you want the controller to send to you

You can, for example, establish restricted-access policies based on time-of-day, web addresses, and web address keywords. You can block Internet access by applications and services on the LAN, such as chat rooms or games. You can block just certain groups of PCs on your network from being accessed by the Option or public DMZ network.

7.1 Firewall Rules

Advanced > Firewall Settings > Firewall Rules

Inbound (Option to LAN/DMZ) rules restrict access to traffic entering your network, selectively allowing only specific outside users to access specific local resources. By default all access from the insecure Option side are blocked from accessing the secure LAN, except in response to requests from the Option or DMZ. To allow outside devices to access services on the secure LAN, you must create an inbound fire wall rule for each service.

If you want to allow incoming traffic, you must make the controllers Option port IP address known to the public. This is called "exposing your host." How you make your address known depends on how the Option ports are configured; for this controller you may use the IP address if a static address is assigned to the Option port, or if your Option address is dynamic a DDNS (Dynamic DNS) name can be used.

Outbound (LAN/DMZ to Option) rules restrict access to traffic leaving your network, selectively allowing only specific local users to access specific outside resources. The default outbound rule is to allow access from the secure zone (LAN) to either the public DMZ or insecure Option. On other hand the default outbound rule is to deny access from DMZ to insecure Option. You can change this default behaviour in the *Firewall Settings > Default Outbound Policy* page. When the default outbound policy is allow always, you can to block hosts on the LAN from accessing internet services by creating an outbound firewall rule for each service.

Figure 106: List of Available Firewall Rules

DWC-1000		SETUP			ADVANO	ED	τοοι	.s		STATUS	;
Global 🕨		Operation succeeded									
Peer Controllers	FIREV										
AP Profile	TINE							-			
SSIDs	A fires specifi	A firewall is a security mechanism to selectively block or allow certain types of traffic in accordance with rules specified by network administrators. You can use this page to manage the firewall rules that control traffic to									
WIDS Security	and fr allows	and from your network. The List of Available Firewall Rules table includes all firewall rules for this device and allows several operations on the firewall rules.									
Captive Portal	List o	f Availab	la Firav	vall Ri	ilas						
Client	LISE U	Availab	From	То	110.5			Dect	Local	Internet	
Application Rules	#	Status	Zone	Zone	Service	Action	Source Hosts	Hosts	Server	Dest	Log
Website Filter	1	Enabled	LAN	DMZ	ANY	ALLOW always	192.168.17.15 - 192.168.17.50	Any			Always
Firewall Settings ▷			Edit		Enable	Die	able De	lete	Ad	d	
IPv6			Luit		LINGDIC			ioro		u j	
Advanced Network 🕨					Move	Fo: Fire	st 👻 Mov	e			

7.2 Defining Rule Schedules

Tools > Schedules

Firewall rules can be enabled or disabled automatically if they are associated with a configured schedule. The schedule configuration page allows you to define days of the week and the time of day for a new schedule, and then this schedule can be selected in the firewall rule configuration page.

All schedules will follow the time in the controller's configured time zone. Refer to the section on choosing your Time Zone and configuring NTP servers for more information. Figure 107: List of Available Schedules to bind to a firewall rule

DWC-1000		SETUP	ADVANCED	TOOLS	S	TATUS		
Admin 🕨		Operation succeeded						
Date and Time	SCHED	ULES				LOGOUT		
Log Settings 🔹 🕨								
System	When y Availab	When you create a firewall rule, you can specify a schedule when the rule applies. The table lists all the Available Schedules for this device and allows several operations on the Schedules.						
Firmware	List of	List of Available Schedules						
Firmware via USB		Name	Day	s	Start Time	End Time		
Dynamic DNS		Guest	Tuesday, Wednes	day, Thursday	09:00 AM	05:00 PM		
System Check		Sales Department	All Da	ys	12:00 AM	11:59 PM		
Schedules								
License			Edit Del	ete Add				

7.3 Configuring Firewall Rules

The following feature is available upon licensed activation of VPN / Firewall features for the system.

Advanced > Firewall Settings > Firewall Rules

All configured firewall rules on the controller are displayed in the Firewall Rules list. This list also indicates whether the rule is enabled (active) or not, and gives a summary of the From/To zone as well as the services or users that the rule affects.

To create a new firewall rules, follow the steps below:

- 1. View the existing rules in the List of Available Firewall Rules table.
- 2. To edit or add an outbound or inbound services rule, do the following:
 - To edit a rule, click the checkbox next to the rule and click Edit to reach that rule's configuration page.
 - To add a new rule, click Add to be taken to a new rule's configuration page. Once created, the new rule is automatically added to the original table.

- Chose the From Zone to be the source of originating traffic: either the secure LAN, public DMZ, or insecure Option. For an inbound rule Option should be selected as the From Zone.
- 4. Choose the To Zone to be the destination of traffic covered by this rule. If the From Zone is the Option, the to Zone can be the public DMZ or secure LAN. Similarly if the From Zone is the LAN, then the To Zone can be the public DMZ or insecure Option.
- 5. Parameters that define the firewall rule include the following:
 - Service: ANY means all traffic is affected by this rule. For a specific service the drop down list has common services, or you can select a custom defined service.
 - Action & Schedule: Select one of the 4 actions that this rule defines: BLOCK always, ALLOW always, BLOCK by schedule otherwise ALLOW, or ALLOW by schedule otherwise BLOCK. A schedule must be preconfigured in order for it to be available in the dropdown list to assign to this rule.
 - Source & Destination users: For each relevant category, select the users to which the rule applies:
 - Any (all users)
 - Single Address (enter an IP address)
 - Address Range (enter the appropriate IP address range)
 - Log: traffic that is filtered by this rule can be logged; this requires configuring the controller's logging feature separately.
 - QoS Priority: Outbound rules (where To Zone = insecure Option only) can have the traffic marked with a QoS priority tag. Select a priority level:
 - Normal-Service: ToS=0 (lowest QoS)
 - Minimize-Cost: ToS=1
 - Maximize-Reliability: ToS=2
 - Maximize-Throughput: ToS=4
 - Minimize-Delay: ToS=8 (highest QoS)

- 6. Inbound rules can use Destination NAT (DNAT) for managing traffic from the Option. Destination NAT is available when the To Zone = DMZ or secure LAN.
 - With an inbound allow rule you can enter the internal server address that is hosting the selected service.
 - You can enable port forwarding for an incoming service specific rule (From Zone = Option) by selecting the appropriate checkbox. This will allow the selected service traffic from the internet to reach the appropriate LAN port via a port forwarding rule.
 - Translate Port Number: With port forwarding, the incoming traffic to be forwarded to the port number entered here.
 - External IP address: The rule can be bound to a specific Option interface by selecting either the primary Option or configurable port Option as the source IP address for incoming traffic.
 - This controller supports multi-NAT and so the External IP address does not necessarily have to be the Option address. On a single Option interface, multiple public IP addresses are supported. If your ISP assigns you more than one public IP address, one of these can be used as your primary IP address on the Option port, and the others can be assigned to servers on the LAN or DMZ. In this way the LAN/DMZ server can be accessed from the internet by its aliased public IP address.
- Outbound rules can use Source NAT (SNAT) in order to map (bind) all LAN/DMZ traffic matching the rule parameters to a specific Option interface or external IP address (usually provided by your ISP).

Once the new or modified rule parameters are saved, it appears in the master list of firewall rules. To enable or disable a rule, click the checkbox next to the rule in the list of firewall rules and choose Enable or Disable.

The controller applies firewall rules in the order listed. As a general rule, you should move the strictest rules (those with the most specific services or addresses) to the top of the list. To reorder rules, click the checkbox next to a rule and click up or down.

Figure 108: Example where an outbound SNAT rule is used to map an external IP address (209.156.200.225) to a private DMZ IP address (10.30.30.30)



Figure 109: The firewall rule configuration page allows you to define the To/From zone, service, action, schedules, and specify source/destination IP addresses as needed.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Global 🕨								
Peer Controllers	FIREWALL RULES			LOGOUT				
AP Profile	This page allows you to ac	dd a new firewall rule or edit t	he configuration of an existin	g firewall rule. The details				
SSIDs	will then be displayed in th	vill then be displayed in the List of Available Firewall Rules table on the Firewall Rules page. Save Settings Don't Save Settings Don't Save Settings Don't Save Settings						
WIDS Security	Save Settings							
Captive Portal	Firewall Rule Configu	ration						
Client	From Zone:	SE	CURE (LAN) 🗸					
Application Rules	Available VLANs:	De	fault 👻					
Website Filter 🕨 🕨	To Zone:	INS	SECURE (Option) -					
Firewall Settings ▷	Available VI ANs:	De	fault					
IPv6	Convicou		×					
Advanced Network 🕨	Service:	AN						
Routing	Action:	Alw	vays Block	•				
Certificates	Select Schedule:	Gu	est 👻					
Users 🕨	Source Hosts:	Ang	/ 🗸					
IP/MAC Binding	From:							
Radius Settings	То:							
Controller Settings	Destination Hosts:	Ang	/ 🗸					
Intel [®] AMT	From:							
	То:							

7.3.1 Firewall Rule Configuration Examples

Example 1: Allow inbound HTTP traffic to the DMZ

Situation: You host a public web server on your local DMZ network. You want to allow inbound HTTP requests from any outside IP address to the IP address of your web server at any time of day.

Solution: Create an inbound rule as follows.

Parameter	Value
From Zone	Insecure (Option 1/ Option2)
To Zone	Public (DMZ)
Service	НТТР
Action	ALLOW alw ays
Send to Local Server (DNAT IP)	192.168.5.2 (w eb server IP address)
Destination Users	Any
Log	Never

Example 2: Allow videoconferencing from range of outside IP addresses

Situation: You want to allow incoming videoconferencing to be initiated from a restricted range of outside IP addresses (132.177.88.2 - 132.177.88.254), from a branch office.

Solution: Create an inbound rule as follows. In the example, CUSeeMe (the video conference service used) connections are allowed only from a specified range of external IP addresses.

Parameter	Value
From Zone	Insecure (Option 1/ Option2)
To Zone	Secure (LAN)
Service	CU-SEEME: UDP
Action	ALLOW alw ays
Send to Local Server (DNAT IP)	192.168.10.11
Destination Users	Address Range
From	132.177.88.2
То	134.177.88.254
Enable Port Forw arding	Yes (enabled)

Example 3: Multi-NAT configuration

Situation: You want to configure multi-NAT to support multiple public IP addresses on one Option port interface.

Solution: Create an inbound rule that configures the firewall to host an additional public IP address. Associate this address with a web server on the DMZ. If you arrange with your ISP to have more than one public IP address for your use, you can use the additional public IP addresses to map to servers on your LAN. One of these public IP addresses is used as the primary IP address of the controller. This address is used to provide Internet access to your LAN PCs through NAT. The other addresses are available to map to your DMZ servers.

The following addressing scheme is used to illustrate this procedure:

• Option IP address: 10.1.0.118

- LAN IP address: 192.168.10.1; subnet 255.255.255.0
- Web server host in the DMZ, IP address: 192.168.12.222
- Access to Web server: (simulated) public IP address 10.1.0.52

Parameter	Value
From Zone	Insecure (Option 1/ Option 2)
To Zone	Public (DMZ)
Service	НТТР
Action	ALLOW alw ays
Send to Local Server (DNAT IP)	192.168.12.222 (w eb server local IP address)
Destination Users	Single Address
From	10.1.0.52
Option Users	Any
Log	Never

ple 4: Block traffic by schedule if generated from specific range of machines

Use Case: Block all HTTP traffic on the weekends if the request originates from a specific group of machines in the LAN having a known range of IP addresses, and anyone coming in through the Network from the Option (i.e. all remote users).

Configuration:

- 1. Setup a schedule:
 - To setup a schedule that affects traffic on weekends only, navigate to Security: Schedule, and name the schedule "Weekend"

- Define "weekend" to mean 12 am Saturday morning to 12 am Monday morning – all day Saturday & Sunday
- In the Scheduled days box, check that you want the schedule to be active for "specific days". Select "Saturday" and "Sunday"
- In the scheduled time of day, select "all day" this will apply the schedule between 12 am to 11:59 pm of the selected day.
- Click apply now schedule "Weekend" isolates all day Saturday and Sunday from the rest of the week.

Figure 110: Schedule configuration for the above example.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Admin 🕨								
Date and Time	SCHEDULE CONFIGURA	ATION		LOGOUT				
Log Settings 🕨 🕨	This page allows user to co	onfigure schedules. These sch	edules then can be applied t	to firewall rules to achieve				
System	schedule based firewall.	schedule based firewall.						
Firmware	Save Settings	Don't Save Settings	<u> </u>					
Firmware via USB	Schedule Name							
Dynamic DNS	Name:							
System Check	Scheduled Davs							
Schedules	Scheduled Days							
License	Do you want this s active on all days o	r specific days?	Days 👻					
	Monday:							
	Tuesday:							
	Wednesday:							
	Thursday:							
	Friday:							
	Saturday:							
	Sunday:							

- 2. Since we are trying to block HTTP requests, it is a service with To Zone: Insecure (Option 1/ Option2) that is to be blocked according to schedule "Weekend".
- **3.** Select the Action to "Block by Schedule, otherwise allow". This will take a predefined schedule and make sure the rule is a blocking rule during the defined dates/times. All other times outside the schedule will not be affected by this firewall blocking rule

- 4. As we defined our schedule in schedule "Weekend", this is available in the dropdown menu
- 5. We want to block the IP range assigned to the marketing group. Let's say they have IP 192.168.10.20 to 192.168.10.30. On the Source Users dropdown, select Address Range and add this IP range as the from and To IP addresses.
- 6. We want to block all HTTP traffic to any services going to the insecure zone. The Destination Users dropdown should be "any".
- 7. We don't need to change default QoS priority or Logging (unless desired) clicking apply will add this firewall rule to the list of firewall rules.
- 8. The last step is to enable this firewall rule. Select the rule, and click "enable" below the list to make sure the firewall rule is active

7.4 Security on Custom Services

Advanced > Firewall Settings > Custom Services

Custom services can be defined to add to the list of services available during firewall rule configuration. While common services have known TCP/UDP/ICMP ports for traffic, many custom or uncommon applications exist in the LAN or Option. In the custom service configuration menu you can define a range of ports and identify the traffic type (TCP/UDP/ICMP) for this service. Once defined, the new service will appear in the services list of the firewall rules configuration menu.

Figure 111: List of user defined services.

DWC-1000	SETUP	ADVANCED		TOOLS	STATUS		
Global 🕨	Operation succeeded						
Peer Controllers	CUSTOM SERVICES				LOGOUT		
AP Profile							
SSIDs	When you create a firew services are available for	all rule, you can specify r selection, and you car	/ a service that is 1 create your owr	controlled by the ri custom services. T	ule Common types of This page allows creation		
WIDS Security	of custom services again the List of Available Cust	of custom services against which firewall rules can be defined. Once defined, the new service will appear in the List of Available Custom Services table.					
Captive Portal	List OF Available Cus	tom Sanvicas					
Client		Ture			-t Danage		
Application Rules 🕨	name	туре		тсыь туре / ьо	rt Kange		
Website Filter	DocServer	TCP		4554 - 45	56		
Firewall Settings		Edit	Delete	Add			
IPv6							
Advanced Network 🕨 🕨							

7.5 ALG support

Advanced > Firewall Settings > ALGs

Application Level Gateways (ALGs) are security component that enhance the firewall and NAT support of this controller to seamlessly support application layer protocols. In some cases enabling the ALG will allow the firewall to use dynamic ephemeral TCP/ UDP ports to communicate with the known ports a particular client application (such as H.323 or RTSP) requires, without which the admin would have to open large number of ports to accomplish the same support. Because the ALG understands the protocol used by the specific application that it supports, it is a very secure and efficient way of introducing support for client applications through the controller's firewall.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Global 🕨								
Peer Controllers	ALGS			LOGOUT				
AP Profile	Application Level Gateway	allows customized NAT trave	rsal filters to be plugged into	the gateway to support				
SSIDs	address and port translati IPsec, PPTP etc. Each ALG	address and port translation for certain application layer "control/data" protocols such as TFTP, SIP, RTSP, IPsec, PPTP etc. Each ALG provides special handling for a specific protocol or application. A number of ALGs						
WIDS Security	for common applications a	re enabled by default.						
Captive Portal	Save Settings	Don't Save Setting	S					
Client	Enable ALGs							
Application Rules	РРТР:							
Website Filter 🕨 🕨	IPsec:							
Firewall Settings ▷	RTSP:							
IPv6	SIP:							
Advanced Network 🕨 🕨	H.323:							
Routing ►	SMTP:							
Certificates	DNS:							
Users >	TFTP:							
IP/MAC Binding	L							

Figure 112: Available ALG support on the controller.

7.6 VPN Passthrough for Firewall

Advanced > Firewall Settings > VPN Passthrough

This controller's firewall settings can be configured to allow encrypted VPN traffic for IPsec, PPTP, and L2TP VPN tunnel connections between the LAN and internet. A specific firewall rule or service is not appropriate to introduce this passthrough support; instead the appropriate check boxes in the VPN Passthrough page must be enabled.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Global 🕨								
Peer Controllers	VPN PASSTHROUGH			LOGOUT				
AP Profile	This page allows user to co	onfigure VPN (IPsec, PPTP and	d L2TP) passthrough on the r	outer. Enabled				
SSIDs	passthrough checkboxes h	passthrough checkboxes have higher priority than firewall rules based on the same service. Save Settings Don't Save Settings						
WIDS Security	Save Settings							
Captive Portal	VPN Passthrough							
Client	IPsec:	V						
Application Rules	РРТР:							
Website Filter 🔹 🕨	L2TP:							
Firewall Settings								
IPv6								
Advanced Network								
Routing •								
Certificates								
Users 🕨								

Figure 113: Passthrough options for VPN tunnels

7.7 Client

Advanced > Client

The Known Client Summary shows the wireless clients currently in the Known Client Database and allows you to add new clients or modify existing clients to the database.

MAC Address: Shows the MAC address of the known client.

Name: Shows the descriptive name configured for the client when it was added to the Known Client database.

Authentication Action: When MAC authentication is enabled on the network, this field shows the action to take on a wireless client. The following options are available.

Grant: Allow the client with the specified MAC address to access the network. **Deny**: Prohibit the client with the specified MAC address from accessing the network.

Global Action: Use the global white-list or black-list action configured on the Advanced Global Configuration page to determine how to handle the client.

Figure 114: List of Known Clients

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Global 🕨								
Peer Controllers	KNOWN CLIENTS			LOGOUT				
AP Profile	The Known Client Summ:	The Known Client Symmetry above the wireless slights symmetry in the Known Client Database and allows						
SSIDs	you to add new clients o	you to add new clients or modify existing clients to the database.						
WIDS Security 🕨 🕨	List of Known Clients	List of Known Clients						
Captive Portal 🔹 🕨	MAC Add	ress Name	Authen	tication Action				
Client	00:00:00	:00:02 global	Glo	obal Action				
Application Rules	70:00:00:60	:00:00 client-de	ny	Deny				
Website Filter 🕨 🕨		00:00:00	:00:00					
Firewall Settings 🛛 🕨								
IPv6 🕨		Lung Der	Auu					

The following actions are supported from this page:

Add: Add's a client with the MAC address you enter in the field to the Known Client database.

Delete: Removes the selected client from the Known Client database.

Edit: changes the setting of particular MAC address

7.8 Application Rules

The following feature is available upon licensed activation of VPN / Firewall features for the system.

Advanced > Application Rules > Application Rules

Application rules are also referred to as port triggering. This feature allows devices on the LAN or DMZ to request one or more ports to be forwarded to them. Port triggering waits for an outbound request from the LAN/DMZ on one of the defined outgoing ports, and then opens an incoming port for that specified type of traffic. This can be thought of as a form of dynamic port forwarding while an application is transmitting data over the opened outgoing or incoming port(s).

Port triggering application rules are more flexible than static port forwarding that is an available option when configuring firewall rules. This is because a port triggering rule does not have to reference a specific LAN IP or IP range. As well ports are not left open when not in use, thereby providing a level of security that port forwarding does not offer.

Port triggering is not appropriate for servers on the LAN, since there is a dependency on the LAN device making an outgoing connection before incoming ports are opened.

Some applications require that when external devices connect to them, they receive data on a specific port or range of ports in order to function properly. The controller must send all incoming data for that application only on the required port or range of ports. The controller has a list of common applications and games with corresponding outbound and inbound ports to open. You can also specify a port triggering rule by defining the type of traffic (TCP or UDP) and the range of incoming and outgoing ports to open when enabled.

Figure 115: List of Available Application Rules showing 4 unique rules

DWC-1000		SETUP		ADVA	NCED	TOOLS		STATUS	
Global 🕨									
Peer Controllers	APP	APPLICATION RULES LOGOUT							
AP Profile	The	The table lists all the available port triggering rules and allows several operations on the rules.							
SSIDs	List	List of Available Application Rules							
WIDS Security						Outgoin	g Ports	Incomin	g Ports
Captive Portal		Name	Enable	Protocol	Interface	Start Port	End Port	Start Port	End Port
Client		XboxUDP	Yes	TCP	LAN	88	88	88	88
Application Rules		Edit Delete Add							
Website Filter									

The application rule status page will list any active rules, i.e. incoming ports that are being triggered based on outbound requests from a defined outgoing port.

7.9 Application Rules Status

Advanced > Application Rules > Application Rules Status

This page allows displaying the list of available application rules and corresponding satus

Figure 116: List of Available Application Rules and corresponding status

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS			
Global 🕨				·			
Peer Controllers 🕨 🕨	APPLICATION RULES STATUS						
AP Profile	This page lists the application rules currently configured.						
SSIDs	Application Rules Status						
WIDS Security 🕨 🕨	LAN/DMZ IP Address Open Ports Time Remaining (Sec.)		Remaining (Sec.)				
Captive Portal 🛛 🕨	192.168.10.10	0 400 - 6	400 - 600 595				
Client	Refresh						
Application Rules 🛛 🖒							
Website Filter 🔹 🕨							
Firewall Settings 🛛 🕨							

7.10 Web Content Filtering

The gateway offers some standard web filtering options to allow the admin to easily create internet access policies between the secure LAN and in secure Option. Instead of creating policies based on the type of traffic (as is the case when using firewall rules), web based content itself can be used to determine if traffic is allowed or dropped.

7.10.1 Content Filtering

The following feature is available upon licensed activation of VPN / Firewall features for the system.

Advanced > Website Filter > Content Filtering

Content filtering must be enabled to configure and use the subsequent features (list of Trusted Domains, filtering on Blocked Keywords, etc.). Proxy servers, which can be used to circumvent certain firewall rules and thus a potential security gap, can be blocked for all LAN devices. Java applets can be prevented from being downloaded from internet sites, and similarly the gateway can prevent ActiveX controls from being downloaded via Internet Explorer. For added security cookies, which typically contain session information, can be blocked as well for all devices on the private network.

Figure 117: Content Filtering used to block access to proxy servers and prevent ActiveX controls from being downloaded

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS		
Global 🕨						
Peer Controllers	CONTENT FILTERING			LOGOUT		
AP Profile	This content filtering optio	n allows the user to block acc	ess to certain Internet sites.	Up to 32 key words in the		
SSIDs	Site's name (web site UKL) can be specified, which will block access to the site. To setup UKLs, go to Approved URLs and Blocked Keywords page.					
WIDS Security	Save Settings Don't Save Settings					
Captive Portal						
Client	Content Filtering Con	figuration				
Application Rules	Enable Content Filt	ering:				
Website Filter D	Web Components					
Firewall Settings	Proxy:					
IPv6 🕨	Java:					
Advanced Network 🔸	ActiveX:					
Routing •	Cookies:					
Certificates						

7.10.2 Approved URLs

Advanced > Website Filter > Approved URLs

The Approved URLs is an acceptance list for all URL domain names. Domains added to this list are allowed in any form. For example, if the domain "yahoo" is added to this list then all of the following URL's are permitted access from the LAN: www.yahoo.com, yahoo.co.uk, etc. Import/export from a text or CSV file for Approved URLs is also supported
Figure 118: Two trusted domains added to the Approved URLs List

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	APPROVED URLS			LOGOUT
AP Profile	This page displays the app	roved URLs.		
SSIDs	Approved URLs List			
WIDS Security		Truste	ed Domains	
Captive Portal		www	.yahoo.com	
Client		www.f	acebook.com	
Application Rules		Edit Del	ete Add	
Website Filter				
Firewall Settings	Import Approved URI	s		
IPv6	Add Approved URL	s from File:		Browse
Advanced Network 🕨 🕨			mport	
Routing •			·	
Certificates				

7.10.3 Blocked Keywords

Advanced > Website Filter > Blocked Keywords

Keyword blocking allows you to block all website URL's or site content that contains the keywords in the configured list. This is lower priority than the Approved URL List; i.e. if the blocked keyword is present in a site allowed by a Trusted Domain in the Approved URL List, then access to that site will be allowed. Import/export from a text or CSV file for keyword blocking is also supported.

Figure	119:	One	keyword	added	to	the	block	list
			•					

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨		Operation	succeeded	
Peer Controllers				LOCOUT
AP Profile	BLOCKED RETWORDS			LOGOUT
SSIDs	You can block access to w websites that contain the	ebsites by entering complete specified characters in the U	URLs or keywords. Keywords RLs or the page contents The	prevent access to table lists all the Blocked
WIDS Security	keywords and allows seve	ral operations on the keywor	ds.	
Captive Portal	Save Settings	Don't Save Setting	S	
Client	Blocked All URL Confi	guration		
Application Rules 🔹 🕨	Block All URL:			
Website Filter D				
Firewall Settings	Blocked Keywords			
IPv6	Status		Blocked Keyword	1
Advanced Network	Enabled		explosive	
Routing	Edit	En able Dis	able Delete	Add
Certificates				
Users >	Import Blocked Keyw	ords		
IP/MAC Binding	Add Blocked Keywo	ords from File:		Browse
Radius Settings			Import	

7.10.4 Export Web Filter

Advanced > Website Filter > Export

Export Approved URLs: Feature enables the user to export the URLs to be allowed to a csv file which can then be downloaded to the local host. The user has to click the export button to get the csv file.

Export Blocked Keywords: This feature enables the user to export the keywords to be blocked to a csv file which can then be downloaded to the local host. The user has to click the export button to get the csv file.

Figure 120: Export Approved URL list

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	EXPORT WEB FILTER			LOGOUT
AP Profile				
SSIDs	Export Web Filter			
WIDS Security	Export Approved U	RLs:	xport	
Captive Portal	Export Blocked Key	words:	xport	
Client				
Application Rules				
Website Filter				
Firewall Settings				

7.11 IP/MAC Binding

Advanced > IP/MAC Binding

Another available security measure is to only allow outbound traffic (from the LAN to Option) when the LAN node has an IP address matching the MAC address bound to it. This is IP/MAC Binding, and by enforcing the gateway to validate the source traffic's IP address with the unique MAC Address of the configured LAN node, the administrator can ensure traffic from that IP address is not spoofed. In the event of a violation (i.e. the traffic's source IP address doesn't match up with the expected MAC address having the same IP address) the packets will be dropped and can be logged for diagnosis.

Figure 121: Example binding a LAN host's MAC Address to a served IP address

DWC-1000		SETUP	ADVANCED	TOOLS	STATUS	
Global 🕨			Operation	succeeded		
Peer Controllers	TP/M	AC BINDING			LOGOU	л
AP Profile	The	table lists all the surr	anthu defined TD MAC Rind aut	a and allows soveral	enerations on the sules	
SSIDs	ine	ladie lists all the curre	enuy denned 19/MAC bind ruk	es anu allows several	operations on the rules.	
WIDS Security	List	of IP/MAC Bindi	ng			
Captive Portal		Name	MAC Address	IP Address	Log Dropped Packets	
Client		test-ipmac1	AA:12:AA:AA:AA:FF	97.0.0.8	Enabled	
Application Rules			Edit De	lete Add		
Website Filter 🕨 🕨						
Firewall Settings						

In the above example, if there is an IP/MAC Binding violation, the violating packet will be dropped and logs will be captured.

7.12 RADIUS Settings

Advanced > RADUIS Settings

From the RADIUS Server Configuration page, you can add a new RADIUS server, configure settings for a new or existing RADIUS server, and view RADIUS server status information.

Figure 122: RADIUS Server Configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Global 🕨								
Peer Controllers	RADIUS SERVER			LOGOUT				
AP Profile	This page configures the	RADIUS servers to be used	for authentication. A RAD	DIUS server maintains a				
SSIDs	can be used for authentic	database of user accounts used in larger environments. If a RADIUS server is configured in the LAN, it can be used for authenticating users that want to connect to the wireless network provided by this device. If the first/primary RADIUS server is not accessible at any time, then the device will attempt to contact the secondary RADIUS server for user authentication.						
WIDS Security	contact the secondary Ri							
Captive Portal	Save Settings	Don't Save Setting	gs					
Client	Padius Server Config	uration						
Application Rules	Authentisation Ser							
Website Filter 🕨 🕨	(Primary):	19	2.168.1.2					
Firewall Settings	Authentication Por	rt: 18	12					
IPv6 ►	Secret:	••	•••••					
Advanced Network 🕨	Timeout:	1	(Seconds)					
Routing ▶	Detries	2						
Certificates	Ketnes:	2						
Users >	Authentication Ser (Secondary):	ver IP Address	2.168.1.3					
IP/MAC Binding	Authentication Por	t: 18	12					
Radius Settings	Secret							
Switch Settings	Secret.							
Intel [®] AMT	Timeout:	1	(Seconds)					
	Retries:	2						

Authentication Server IP Address (Primary): IP address of the primary RADIUS authentication server.

Authentication Server IP Address (Secondary): IP address of the secondary RADIUS authentication server.

Authentication Port: RADIUS authentication server port to send RADIUS messages.

Secret: Secret key that allows the device to log into the configured RADIUS server. It must match the secret on RADIUS server.

Timeout: Set the amount of time in seconds, the router should wait for a response from the RADIUS server.

Retries: This determines the number of tries the router will make to the RADIUS server before giving up.

7.13 Switch Settings

Advanced > Switch Settings

This page allows user to enable/disable power saving, jumbo frames in the router.

Figure 123: Switch settings

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	SWITCH SETTINGS			LOGOUT
AP Profile	This page allows user to	enable/disable power saving	g, jumbo frames in the router	r.
SSIDs	Save Settings	Don't Save Setting	gs	
WIDS Security	Power Soving Option	c		
Captive Portal	Power Saving Option	ink Status:		
Client	Power Saving by C	able Length:		
Application Rules	Power Saving by C			
Website Filter 🕨 🕨	Jumbo Frames Optio	n		
Firewall Settings	Enable Jumbo Fran	nes:		
IPv6 ►				
Advanced Network				
Routing 🕨				
Certificates				
Users 🕨				
IP/MAC Binding				
Radius Settings				
Switch Settings				

Power Saving State: When enabled, the total power to the LAN controller is dependent on the number of connected ports. The overall current draw when a single

port is connected is less than when all of the available LAN ports have an active Ethernet connection.

Length Detection State: When enabled the LAN controller will reduce the overall current supplied to the LAN port when a small cable length is connected to that port. Longer cables have higher resistance than shorter cables and require more power to transmit packets over that distance. This option will reduce the power to a LAN port if an Ethernet cable of less than 10 ft is detected as being connected to that port.

Jumbo Frames Option: When enabled, LAN side devices can exchange traffic contaning jumbo frames.

7.14 Protecting from Internet Attacks

Advanced > Advanced Network > Attack Checks

Attacks can be malicious security breaches or unintentional network issues that render the controller unusable. Attack checks allow you to manage Option security threats such as continual ping requests and discovery via ARP scans. TCP and UDP flood attack checks can be enabled to manage extreme usage of Option resources.

Additionally certain Denial-of-Service (DoS) attacks can be blocked. These attacks, if uninhibited, can use up processing power and bandwidth and prevent regular network services from running normally. ICMP packet flooding, SYN traffic flooding, and Echo storm thresholds can be configured to temporarily suspect traffic from the offending source.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	ATTACK CHECKS			LOGOUT
AP Profile	This page allows you to sp	ecify whether or not to prote	ct against common attacks fr	om the LAN and WAN
SSIDs	networks.	Dech Court Courte		
WIDS Security	Save Settings	Don't Save Setting:	3	
Captive Portal	Option Security Chec	ks		
Client	Enable Stealth Mod	le: 🔍		
Application Rules	Block TCP flood:			
Website Filter 🕨 🕨	LAN Security Checks			
Firewall Settings	Block UDP flood:			
IPv6	UDP Connection Lir	nit: 25		
Advanced Network D	Allow Ping from La	n: 📝		
Routing				
Certificates	ICSA Settings	_		
Users 🕨	Block ICMP Notifica	tion:		
IP/MAC Binding	Block Fragmented F	Packets:		
Radius Settings	Block Multicast Pac	kets:		
Controller Settings	Block Spoofed IP P	ackets:		
Intel [®] AMT	DoS Attacks			
	SYN Flood Detect R	ate [max/sec]: 128		

Figure 124: Protecting the controller and LAN from internet attacks

Chapter 8. IPsec / PPTP / L2TP VPN

The following feature is available upon licensed activation of VPN / Firewall features for the system.

A VPN provides a secure communication channel ("tunnel") between two gateway controller or a remote PC client. The following types of tunnels can be created:

- Gateway-to-gateway VPN: to connect two or more controller to secure traffic between remote sites.
- **Remote Client** (client-to-gateway VPN tunnel): A remote client initiates a VPN tunnel as the IP address of the remote PC client is not known in advance. The gateway in this case acts as a responder.

Remote client behind a NAT controller: The client has a dynamic IP address and is behind a NAT controller. The remote PC client at the NAT controller initiates a VPN tunnel as the IP address of the remote NAT controller is not known in advance. The gateway Option port acts as responder.

Inside

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Figure 125: Example of Gateway-to-Gateway IPsec VPN tunnel using two





8.1 VPN Wizard

Setup > Wizard > VPN Wizard

You can use the VPN wizard to quickly create both IKE and VPN policies. Once the IKE or VPN policy is created, you can modify it as required.

Figure 127: VPN Wizard launch screen

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS			
Wizard D							
WLAN Global Settings	VPN WIZARD			LOGOUT			
AP Management 🕨	This page will guide you th	nrough common and easy step	os to configure IPsec VPN poli	cies.			
WLAN Visualization 🕨	VPN Setup Wizard						
Internet Settings	If you would like to utilize	our easy to use Web-based V	Vizards to assist you in VPN C	opfiguration, dick on the			
Network Settings	button below.	our easy to use web-based v		ornigaration, cick on the			
LAN QoS 🕨		VPN Setu	up Wizard				
VPN Settings	Manual VPN Configur						
VLAN Settings							
DMZ Setup	If you would like to configure the VPN Policies of your new D-Link Systems Router manually, dick on the button below.						
USB Settings		Manual VPN	Configuration				
	F O_t O't b O'						
	Easy Setup Site to Si	te vpn Tunnel					
	Easy Setup Site to Site VP	N Tunnel.					
		lqU	Browse				

To easily establish a VPN tunnel using VPN Wizard, follow the steps below:

1. Select the VPN tunnel type to create

The tunnel can either be a gateway to gateway connection (site-to-site) or a tunnel to a host on the internet (remote access).

Set the Connection Name and pre-shared key: the connection name is used for management, and the pre-shared key will be required on the VPN client or gateway to establish the tunnel

Determine the local gateway for this tunnel; if there is more than 1 Option configured the tunnel can be configured for either of the gateways.

2. Configure Remote and Local Option address for the tunnel endpoints

Remote Gateway Type: identify the remote endpoint of the tunnel by FQDN or static IP address

Remote Option IP address / FQDN: This field is enabled only if the peer you are trying to connect to is a Gateway. For VPN Clients, this IP address or Internet Name is determined when a connection request is received from a client.

Local Gateway Type: identify this controller's endpoint of the tunnel by FQDN or static IP address

Local Option IP address / FQDN: This field can be left blank if you are not using a different FQDN or IP address than the one specified in the Option port's configuration.

3. Configure the Secure Connection Remote Accessibility fields to identify the remote network:

Remote LAN IP address: address of the LAN behind the peer gateway

Remote LAN Subnet Mask: the subnet mask of the LAN behind the peer

Note: The IP address range used on the remote LAN must be different from the IP address range used on the local LAN.

4. Review the settings and click Connect to establish the tunnel.

The Wizard will create an Auto IPsec policy with the following default values for a VPN Client or Gateway policy (these can be accessed from a link on the Wizard page):

Parameter	Default value from Wizard
Exchange Mode	Aggressive (Client policy) or Main (Gatew ay policy)
ID Туре	FQDN

Local Option ID	w an_local.com(only applies to Client policies)
Remote Option ID	w an_remote.com(only applies to Client policies)
Encryption Algorithm	3DES
Authentication Algorithm	SHA-1
Authentication Method	Pre-shared Key
PFS Key-Group	DH-Group 2(1024 bit)
Life Time (Phase 1)	24 hours
Life Time (Phase 2)	8 hours
NETBIOS	Enabled (only applies to Gatew ay policies)

The VPN Wizard is the recommended method to set up an Auto IPsec policy. Once the Wizard creates the matching IKE and VPN policies required by the Autopolicy, one can modify the required fields through the edit link. Refer to the online help for details.

Easy Setup Site to Site VPN Tunnel

If you find it difficult to configure VPN policies through VPN wizard use easy setup site to site VPN tunnel. This will add VPN policies by importing a file containing vpn policies.

8.2 Configuring IPsec Policies

Setup > VPN Settings > IPsec > IPsec Policies

An IPsec policy is between this controller and another gateway or this controller and a IPsec client on a remote host. The IPsec mode can be either tunnel or transport depending on the network being traversed between the two policy endpoints. Transport: This is used for end-to-end communication between this controller and the tunnel endpoint, either another IPsec gateway or an IPsec VPN client on a host. Only the data payload is encrypted and the IP header is not modified or encrypted.

Tunnel: This mode is used for network-to-network IPsec tunnels where this gateway is one endpoint of the tunnel. In this mode the entire IP packet including the header is encrypted and/or authenticated.

When tunnel mode is selected, you can enable NetBIOS and DHCP over IPsec. DHCP over IPsec allows this controller to serve IP leases to hosts on the remote LAN. As well in this mode you can define the single IP address, range of IPs, or subnet on both the local and remote private networks that can communicate over the tunnel.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard				
WLAN Global Settings	IPSEC CONFIGURATIO	DN		LOGOUT
AP Management	This page allows user to a	dd/edit VPN (IPsec) policies w	hich includes Auto and Man	ual policies.
WLAN Visualization 🔸	Save Settings	Don't Save Setting	s	
Internet Settings				
Network Settings	General			
LAN QoS	Policy Name:			
VPN Settings	Policy Type:	Aut	o Policy 👻	
VLAN Settings	IKE Version:	۲	IKEv1 🔘 IKEv2	
DMZ Setup	IPsec Mode:	Tur	nnel Mode 👻	
USB Settings 🛛 🕨	Select Local Gatew	opt	tion1 👻	
	Remote Endpoint:	IP /	Address 👻	
	Enable Mode Confi	g: 🔲		
	Enable NetBIOS:			
	Enable RollOver:			
	Protocol:	ES	Ρ 👻	
	Enable DHCP:			
	Local IP:	Sut	onet 👻	
	Local Start IP Add	ress:		

Figure 128: IPsec policy configuration

Once the tunnel type and endpoints of the tunnel are defined you can determine the Phase 1 / Phase 2 negotiation to use for the tunnel. This is covered in the IPsec mode setting, as the policy can be Manual or Auto. For Auto policies, the Internet Key Exchange (IKE) protocol dynamically exchanges keys between two IPsec hosts. The Phase 1 IKE parameters are used to define the tunnel's security association details. The Phase 2 Auto policy parameters cover the security association lifetime and encryption/authentication details of the phase 2 key negotiation.

The VPN policy is one half of the IKE/VPN policy pair required to establish an Auto IPsec VPN tunnel. The IP addresses of the machine or machines on the two VPN endpoints are configured here, along with the policy parameters required to secure the tunnel

Phase1(IKE SA Parameters)	
Exchange Mode:	Main
Direction / Type:	Both 💌
Nat Traversal:	
On:	œ
Off:	0
NAT Keep Alive Frequency (in seconds):	20
Local Identifier Type:	Local Wan IP 💌
Local Identifier:	
Remote Identifier Type:	Remote Wan IP 💌
Remote Identifier:	
Encryption Algorithm:	3DES 💌
Authentication Algorithm:	SHA-1
Authentication Method:	Pre-shared key 💌
Pre-shared key:	
Diffie-Hellman (DH) Group:	Group 2 (1024 bit)
SA-Lifetime (sec):	28800
Enable Dead Peer Detection:	
Detection Period:	10
Reconnect after failure count:	3
 Enable Extended Authentication:	
Username:	admin
Password:	NANNA

Figure 129: IPsec policy configuration continued (Auto policy via IKE)

A Manual policy does not use IKE and instead relies on manual keying to exchange authentication parameters between the two IPsec hosts. The incoming and outgoing security parameter index (SPI) values must be mirrored on the remote tunnel endpoint. As well the encryption and integrity algorithms and keys must match on the remote IPsec host exactly in order for the tunnel to establish successfully. Note that using Auto policies with IKE are preferred as in some IPsec implementations the SPI (security parameter index) values require conversion at each endpoint.

DWC-1000 supports VPN roll-over feature. This means that policies configured on primary Option will rollover to the secondary Option in case of a link failure on a primary Option. This feature can be used only if your Option is configured in Auto-Rollover mode.

Figure 130: IPsec policy configuration continued (Auto / Manual Phase 2)

Phase2-(Manual Policy Parameters)		
SPI-Incoming:		
SPI-Outgoing:		
Encryption Algorithm:	3DES 🗾	
Key Length:		
Key-In:		
Key-Out:		
Integrity Algorithm:	SHA-1	
Key-In:		
Key-Dut:		
Phase2-(Auto Policy Parameters)		
SA Lifetime:	Seconds 💌	
Encryption Algorithm:	3DES 🔍	
Key Length:		
Integrity Algorithm:	SHA-1	
PFS Key Group:	DH Group 1 (768 bit)	

8.2.1 Extended Authentication (XAUTH)

You can also configure extended authentication (XAUTH). Rather than configure a unique VPN policy for each user, you can configure the VPN gateway controller to authenticate users from a stored list of user accounts or with an external authentication server such as a RADIUS server. With a user database, user accounts created in the controller are used to authenticate users.

With a configured RADIUS server, the controller connects to a RADIUS server and passes to it the credentials that it receives from the VPN client. You can secure the connection between the controller and the RADIUS server with the authentication protocol supported by the server (PAP or CHAP). For RADIUS – PAP, the controller first checks in the user database to see if the user credentials are available; if they are not, the controller connects to the RADIUS server.

8.2.2 Internet over IPSec tunnel

In this feature all the traffic will pass through the VPN Tunnel and from the Remote Gateway the packet will be routed to Internet. On the remote gateway side, the outgoing packet will be SNAT'ed.

8.3 Configuring VPN clients

Remote VPN clients must be configured with the same VPN policy parameters used in the VPN tunnel that the client wishes to use: encryption, authentication, life time, and PFS key-group. Upon establishing these authentication parameters, the VPN Client user database must also be populated with an account to give a user access to the tunnel.

> VPN client software is required to establish a VPN tunnel between the controller and remote endpoint. Open source software (such as Open VPN or Openswan) as well as Microsoft IPsec VPN software can be configured with the required IKE policy parameters to establish an IPsec VPN tunnel. Refer to the client software guide for detailed instructions on setup as well as the controller's online help.

The user database contains the list of VPN user accounts that are authorized to use a given VPN tunnel. Alternatively VPN tunnel users can be authenticated using a configured Radius database. Refer to the online help to determine how to populate the user database and/or configure RADIUS authentication.

8.4 PPTP / L2TP Tunnels

This controller supports VPN tunnels from either PPTP or L2TP ISP servers. The controller acts as a broker device to allow the ISP's server to create a TCP control connection between the LAN VPN client and the VPN server.

8.4.1 PPTP Tunnel Support

Setup > VPN Settings > PPTP > PPTP Client

PPTP VPN Client can be configured on this controller. Using this client we can access remote network which is local to PPTP server. Once client is enabled, the user can access *Status* > *Active VPNs* page and establish PPTP VPN tunnel clicking Connect. To disconnect the tunnel, click Drop.

Figure 131: PPTP tunnel configuration – PPTP Client

Internet Settings	PPTP CLIENT		LOGOUT		
Wireless Settings 🛛 🕨	This page allows the user to configure PPTP VPN Client				
Network Settings 🕨 🕨	Save Settings Don't Save Setting				
DMZ Setup 🕨					
VPN Settings 👂	PPTP Client Configuration				
USB Settings	Enable PPTP Client				
VLAN Settings	PPTP Client Configuration				
,,	Server IP:	10.10.10.10			
	Remote Network:	192.168.20.0			
	Remote Netmask:	24			
	Username:	u1			
	Password:	••			
	Mppe Encryption	w.			
	Idle Time Out:	100 (Seconds)			

Figure 132: PPTP VPN connection status

Active PPTP VPN connections			
Connection Status	Action		
Disconnected	Connect		

Setup > VPN Settings > PPTP > PPTP Server

A PPTP VPN can be established through this controller. Once enabled a PPTP server is available on the controller for LAN and Option PPTP client users to access. Once the PPTP server is enabled, PPTP clients that are within the range of configured IP addresses of allowed clients can reach the controller's PPTP server. Once authenticated by the PPTP server (the tunnel endpoint), PPTP clients have access to the network managed by the controller.

Figure 133: PPTP tunnel configuration – PPTP Server

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS		
Wizard 🕨						
WLAN Global Settings	PPTP SERVER			LOGOUT		
AP Management 🔹 🕨	PPTP allows an external us	ser to connect to your router	through the internet. This se	ction allows you to		
WLAN Visualization 🔸	connected dients can function as if they are on your LAN (they can communicate with LAN hosts, access any					
Internet Settings	servers present etc.)					
Network Settings	Save Settings	Don't Save Setting:	8			
LAN QoS 🕨	PPTP Server Configur	ation				
VPN Settings D	Enable PPTP Server	?				
VLAN Settings	PPTP Routing Mode					
DMZ Setup	Nat:	0				
USB Settings 🔶	Classical:					
	Enter the range of IP	addresses that is alloc	ated to PPTP Clients			
	Starting IP Addres	s.				
	Ending IP Address:					
	Authentication Supp	orted				
	PAP:					
	CHAP:					
	MS-CHAP:					
	MS-CHAPv2:					

8.4.2 L2TP Tunnel Support

Setup > VPN Settings > L2TP > L2TP Server

A L2TP VPN can be established through this controller. Once enabled a L2TP server is available on the controller for LAN and Option L2TP client users to access. Once the L2TP server is enabled, L2TP clients that are within the range of config ured IP addresses of allowed clients can reach the controller's L2TP server. Once authenticated by the L2TP server (the tunnel endpoint), L2TP clients have access to the network managed by the controller.

Figure 134: L2TP tunnel configuration – L2TP Server

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	L2TP SERVER			LOGOUT
AP Management 🔹 🕨	L2TP allows an external us	ser to connect to your router	through the internet, forming	a VPN. This section
WLAN Visualization 🔸	router. The connected die	ents can function as if they ar	ange of 1P addresses for clier e on your LAN (they can com	nunicate with LAN hosts,
Internet Settings 🔹 🕨	access any servers preser	nt etc.)		
Network Settings	Save Settings	Don't Save Setting	S	
LAN QoS 🕨	L2TP Server Configur	ation		
VPN Settings D	Enable L2TP Server	?		
VLAN Settings	L2TP Routing Mode			
DMZ Setup	Nat:	0		
USB Settings 🕨 🕨	Classical:	0		
	Enter the range of IP	addresses that is alloc	ated to L2TP Clients	
	Starting IP Addres	s:		
	Ending ID Address	adn	nin	
	Ending IF Address.	Judi	in 1	
	Authentication Supp	orted		
	PAP:			
	CHAP:			
	MS-CHAP:			
	MS-CHAPv2:			

8.4.3 OpenVPN Support

Setup > VPN Settings > OpenVPN > OpenVPN Configuration

Open VPN allows peers to authenticate each other using a pre-shared secret key, certificates, or username/password. When used in a multiclient-server configuration, it allows the server to release an authentication certificate for every client, using signature and Certificate authority. An Open VPN can be established through this controller. Check/Uncheck this and click save settings to start/stop openvpn server.

Mode: OpenVPN daemon mode. It can run in server mode, client mode or access server client mode. In access server client mode, the user has to download the auto login profile from the Openvpn Access Server and upload the same to connect.

Server IP: OpenVPN server IP address to which the client connects (Applicable in client mode).

VPN Network: Address of the Virtual Network.

VPN Netmask: Netmask of the Virtual Network.

Port: The port number on which openvpn server(or Access Server) runs.

Tunnel Protocol: The protocol used to communicate with the remote host. Ex: Tcp, Udp. Udp is the default.

Encryption Algorithm: The cipher with which the packets are encrypted. Ex: BF-CBC, AES-128, AES-192 and AES-256. BF-CBC is the default

Hash algorithm: Message digest algorithm used to authenticate packets. Ex: SHA1, SHA256 and SHA512. SHA1 is the default.

Tunnel Type: Select Full Tunnel to redirect all the traffic through the tunnel. Select Split Tunnel to redirect traffic to only specified resources (added from openVpnClient Routes) through the tunnel. Full Tunnel is the default.

Enable Client to Client communication: Enable this to allow openvpn clients to communicate with each other in split tunnel case. Disabled by default.

Upload Access Server Client Configuration: The user has to download the auto login profile and upload here to connect this controller to the OpenVPN Access Server.

Certificates: Select the set of certificates openvpn server uses. First Row: Set of certificates and keys the server uses. Second Row: Set of certificates and keys newly uploaded.

Enable TLS Authentication Key: Enabling this adds Tls authentication which adds an additional layer of authentication. Can be checked only when the tls key is uploaded. Disabled by default.

Click Save Settings to save the configuration entered.

VLAN Settings	OpenVPN Server/Client Configuration			
	Enable Openvpn:	V		
	Mode:	Server 🗘		
	Server IP:			
	Vpn Network:	128.10.0.0)	
	Vpn Netmask:	255.255.0.0)	
	Port:	1194	(Default:1194)	
	Tunnel Protocol:	UDP \$		
	Encryption Algorithm:	BF-CBC		
	Hash Algorithm:	SHA1 0		
	Tunnel Type:	Full Tunnel 🗘	Full Tunnel \$	
	Enable Client to Client Communication:			
	Upload Access Server Client Configurat	tion		
	Upload Status: No			
	File:		Browse)
	Upload	1		
	Certificates			
	CA Subject Name	Server/Client Cert Subject Name	Server/Client Key Uploaded	y ed
	C=US, ST=CA, L=SanFrancisco, O=Fort-Funston, CN=Openvpn/na	C=US, ST=CA, L=SanFrancisco, O=Fort-Funston, CN=serverA/na	yes yes	

Figure 135: OpenVPN configuration

Chapter 9. SSL VPN

The following feature is available upon licensed activation of VPN / Firewall features for the system.

The controller provides an intrinsic SSL VPN feature as an alternate to the standard IPsec VPN. SSL VPN differs from IPsec VPN mainly by removing the requirement of a pre-installed VPN client on the remote host. Instead, users can securely login through the SSL User Portal us ing a standard web browser and receive access to configured network resources within the corporate LAN. The controller supports multiple concurrent sessions to allow remote users to access the LAN over an encrypted link through a customizable user portal interface, and each SSL VPN user can be assigned unique privileges and network resource access levels.

The remote user can be provided different options for SSL service through this controller:

VPN Tunnel: The remote user's SSL enabled browser is used in place of a VPN client on the remote host to establish a secure VPN tunnel. A SSL VPN client (Active-X or Java based) is installed in the remote host to allow the client to join the corporate LAN with pre-configured access/policy privileges. At this point a virtual network interface is created on the user's host and this will be assigned an IP address and DNS server address from the controller. Once established, the host machine can access allocated network resources.

Port Forwarding: A web-based (ActiveX or Java) client is installed on the client machine again. Note that Port Forwarding service only supports TCP connections between the remote user and the controller. The controller administrator can define specific services or applications that are available to remote port forwarding users instead of access to the full LAN like the VPN tunnel.

ActiveX clients are used when the remote user accesses the portal using the Internet Explorer browser. The Java client is used for other browsers like Mozilla Firefox, Netscape Navigator, Google Chrome, and Apple Safari.



Figure 136: Example of clientless SSL VPN connections to the DWC-1000

9.1 Groups and Users

Advanced > Users > Groups

The group page allows creating, editing and deleting groups. The groups are associated to set of user types. The lists of available groups are displayed in the "List of Group" page with Group name and description of group.

- Click Add to create a group.
- Click Edit to update an existing group.
- Click **Delete** to clear an exisiting group.

Figure 137: List of groups

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	GROUPS			LOGOUT
AP Profile	This page shows the list of	fadded groups to the router.	. The user can add, delete and	d edit the groups also.
SSIDs	List of Groups			
WIDS Security	Grou	р	Description	1
Captive Portal	ADMII	N	Admin Group	,
Client	GUES	т	Guest Group	,
Application Rules		Edit De		
Website Filter 🔹 🕨			Au	
Firewall Settings	Login	Policies Policies B	y Browsers Policies	By IP
IPv6				

Group configuration page allows to create a group with a different type of users. The user types are as follows:

- **PPTP User**: These are PPTP VPN tunnel LAN users that can establish a tunnel with the PPTP server on the Option.
- L2TP User: These are L2TP VPN tunnel LAN users that can establish a tunnel with the L2TP server on the Option.

- Xauth User: This user's authentication is performed by an externally configured RADIUS or other Enterprise server. It is not part of the local user database.
- **SSLVPN User**: This user has access to the SSL VPN services as determined by the group policies and authentication domain of which it is a member. The domain-determined SSL VPN portal will be displayed when logging in with this user type.
- Admin: This is the controller's super-user, and can manage the controller, use SSL VPN to access network resources, and login to L2TP/PPTP servers on the Option. There will always be one default administrator user for the GUI
- Guest User (read-only): The guest user gains read only access to the GUI to observe and review configuration settings. The guest does not have SSL VPN access.
- **Captive Portal User**: These captive portal users has access through the controller. The access is determined based on captive portal policies.

Idle Timeout: This the log in timeout period for users of this group.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	GROUP CONFIGURATIO	DN		LOGOUT
AP Profile	This page allows user to ad	dd a new user group. Once th	his group is added, a user car	n then add system users
SSIDs	Cours Continues	Den h Cours Colling		
WIDS Security	Save Settings	Don't Save Setting	5	
Captive Portal	Group Configuration			
Client	Group Name:			
Application Rules	Description:			
Website Filter 🕨 🕨				
Firewall Settings	User Type			
IPv6	PPTP User:			
Advanced Network 🔸	L2TP User:			
Routing	Xauth User:			
Certificates	SSLVPN User:			
Users D	Admin:			
IP/MAC Binding	Guest User (readon	ly):		
Radius Settings	Captive Portal User			
Controller Settings	Idle Timeout:	10	(Seconds)	

Figure 138: User group configuration

When SSLVPN users are selected, the SSLVPN settings are displayed with the following parameters as captured in SSLVPN Settings. As per the Authentication Type SSL VPN details are configured.

- Authentication Type: The authentication Type can be one of the following: Local User Database (default), Radius-PAP, Radius-CHAP, Radius-MSCHAP, Radius-MSCHAPv2, NT Domain, Active Directory and LDAP.
- Authentication Secret: If the domain uses RADIUS authentication then the authentication secret is required (and this has to match the secret configured on the RADIUS server).
- Workgroup: This is required is for NT domain authentication. If there are multiple workgroups, user can enter the details for up to two workgroups.

- LDAP Base DN: This is the base domain name for the LDAP authentication server. If there are multiple LDAP authentication servers, user can enter the details for up to two LDAP Base DN.
- Active Directory Domain: If the domain uses the Active Directory authentication, the Active Directory domain name is required. Users configured in the Active Directory database are given access to the SSL VPN portal with their Active Directory username and password. If there are multiple Active Directory domains, user can enter the details for up to two authentication domains.
- **Timeout**: The timeout period for reaching the authentication server.
- **Retries**: The number of retries to authenticate with the authentication server after which the DWC-1000 stops trying to reach the server.

SSLVPN 👻
Radius-MSCHAP
(Optional)
admin (Optional)
(Optional)
(Optional)
(Optional)
(Optional)
10 (Seconds)
5

Figure 139: SSLVPN Settings

Login Policies

To set login policies for the group, select the corresponding group click "Login policies". The following parameters are configured:

Group Name: This is the name of the group that can have its login policy edited

Disable Login: Enable to prevent the users of this group from logging into the devices management interface(s)

Deny Login from Option interface: Enable to prevent the users of this group from logging in from a Option (wide area network) interface. In this case only login through LAN is allowed.

Figure 140: Group login policies options

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	GROUPS			LOGOUT
AP Profile	This page allows user to a	dd login policies for the availa	ble users.	
SSIDs	Save Settings	Don't Save Setting	s	
WIDS Security				
Captive Portal	Group Login Policies			
Client	Group Name:	Sale	5	
Application Rules	Disable Login:			
Website Filter	Deny Login from O	ption Interface: 📃		
Firewall Settings				

Policy by Browsers

To set browser policies for the group, select the corresponding group click "Policy by Browsers". The following parameters are configured:

Group Name: This is the name of the group that can have its login policy edited

Deny Login from Defined Browsers: The list of defined browsers below will be used to prevent the users of this group from logging in to the controller's GUI. All nondefined browsers will be allowed for login for this group.

Allow Login from Defined Browsers: The list of defined browsers below will be used to allow the users of this group from logging in to the controllers GUI. All nondefined browsers will be denied for login for this group.

Defined Browsers: This list displays the web browsers that have been added to the Defined Browsers list, upon which group login policies can be defined. (Check Box At First Column Header): Selects all the defined browsers in the table.

Delete: Deletes the selected browser(s).

You can add to the list of Defined Browsers by selecting a client browser from the drop down menu and clicking Add. This browser will then appear in the above list of Defined Browsers.

Click Save Settings to save your changes.



DWC-1000	SETUP	ADVANCED	TOOLS	STATUS	
Global 🕨					
Peer Controllers	GROUPS			LOGOUT	
AP Profile	This page allows user to a	dd browser specific policies fo	or available users.		
SSIDs	Save Settings	Don't Save Setting	s		
WIDS Security					
Captive Portal	Group Policy By Client	t Browser			
Client	Group Name:	Sale	5		
Application Rules	Deny Login from D	efined Browsers: ()			
Website Filter	Allow Login from D	efined Browsers: 🔘			
Firewall Settings	Defined Browsers				
IPv6		Added C	lient Browsers		
Advanced Network		Del	ete		
Routing >					
Certificates	Add Defined Browser				
Users D		Client I	Browser		
IP/MAC Binding		Internet E	xplorer 👻		
Radius Settings			44		
Controller Settings		Aaa			

Policy by IP

To set policies by IP for the group, select the corresponding group click "Policy by IP". The following parameters are configured:

Group Name: This is the name of the group that can have its login policy edited

Deny Login from Defined Browsers: The list of defined browsers below will be used to prevent the users of this group from logging in to the controller GUI. All nondefined browsers will be allowed for login for this group. Allow Login from Defined Browsers: The list of defined browsers below will be used to allow the users of this group from logging in to the controller GUI. All non-defined browsers will be denied for login for this group.

Defined Browsers: This list displays the web browsers that have been added to the Defined Browsers list, upon which group login policies can be defined. (Check Box At First Column Header): Selects all the defined browsers in the table.

Delete: Deletes the selected browser(s).

You can add to the list of Defined Browsers by selecting a client browser from the drop down menu and clicking Add. This browser will then appear in the above list of Defined Browsers.

Click Save Settings to save your changes.

Figure 142: IP policies options

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	GROUPS			LOGOUT
AP Profile	This page allows user to add IP based policies specific policies for available users.			
SSIDs	Save Settings Don't Save Settings			
WIDS Security				
Captive Portal	Groups Policy By Source IP Address			
Client	Group Name:	Sale	5	
Application Rules	Deny Login from Defined Addresses: Image: Image of the second second			
Website Filter	Allow Login from Defined October Control Contr			
Firewall Settings	Defined Addresses			
IPv6	Source Addres	ss Type Netwo	rk Address / IP Address	Mask Length
Advanced Network				-
Routing >		Delete	Add	

Login Policies, Policy by Browsers, Policy by IP are applicable SSL VPN user only.
Advanced > Users > Users

The users page allows adding, editing and deleting existing groups. The user are associated to configured groups. The lists of available users are displayed in the "List of Users" page with User name, associated group and Login status.

- Click Add to create a user.
- Click Edit to update an existing user.
- Click **Delete** to clear an existing user

Figure 143: Available Users with login status and associated Group

DWC-1000	SETUP	SETUP A		TOOLS	STATUS			
Global 🕨								
Peer Controllers	USERS	USERS LOGOUT						
AP Profile	This page shows a list of available users in the system. A user can add, delete and edit the users also. This							
SSIDs	page can also be used for setting policies on users.							
WIDS Security	List of Users							
Captive Portal	User	Name	Group	Login	Status			
Client	🔲 ad	min	ADMIN	Enabled (LAI	N and WAN)			
Application Rules	🔲 gu	est	GUEST	Disa	bled			
Website Filter 🕨 🕨			Edit Del	lete Add				
Firewall Settings								

9.1.1 Users and Passwords

Advanced > Users > Users

The user configurations allow creating users associated to group. The user settings contain the following key components:

User Name: This is unique identifier of the user.

First Name: This is the user's first name

Last Name: This is the user's last name

Select Group: A group is chosen from a list of configured groups.

Password: The password associated with the user name.

Confirm Password: The same password as above is required to mitigate against typing errors.

Idle Timeout: The session timeout for the user.

It is recommended that passwords contains no dictionary words from any language, and is a mixture of letters (both uppercase and lowercase), numbers, and symbols. The password can be up to 30 characters.

DWC-1000	SETUP	ADVANCED	то	OLS	STATUS	
Global 🕨						
Peer Controllers	USERS CONFIGURATION	N			LOGOUT	
AP Profile	This page allows a user to	add new system users.				
SSIDs	Save Settings	Don't Save Setting	s			
WIDS Security						
Captive Portal	Users Configuration				_	
Client	User Name:	Jim	1			
Application Rules	First Name:	First Name: Jim				
Website Filter 🔹 🕨	Last Name:	Ge	orge			
Firewall Settings	Select Group:	AD	DMIN 👻			
IPv6	Password:	••	••••			
Advanced Network 🔸	Confirm Password:	••				
Routing	Idle Timeouti	4		(15		
Certificates	Idle Timeout:	4		(minutes)		
Users D						

Figure 144: User Configuration options

9.2 Using SSL VPN Policies

Setup > VPN Settings > SSL VPN Server > SSL VPN Policies

SSL VPN Policies can be created on a Global, Group, or User level. User level policies take precedence over Group level policies and Group level policies take precedence over Global policies. These policies can be applied to a specific network resource, IP address or ranges on the LAN, or to different SSL VPN services supported by the controller. The List of Available Policies can be filtered based on whether it applies to a user, group, or all users (global).

A more specific policy takes precedence over a generic policy when both are applied to the same user/group/global domain. I.e. a policy for a specific IP address takes precedence over a policy for a range of addresses containing the IP address already referenced.

Figure 145: List of SSL VPN polices (Global filter)

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS			
Wizard 🕨	Please Enable	e <u>Remote Management</u>	to activate SSL VPN Co	onfigurations.			
WLAN Global Settings	SSL VDN DOLICIES						
AP Management 🔹 🕨	SSE VEN POLICIES			Lodoor			
WLAN Visualization 🔸	Policies are useful to permi may be defined at the user	Policies are useful to permit or deny access to specific network resources, IP addresses, or IP networks. They may be defined at the user, group or global level. By Default, a global PERMIT policy (not displayed) was					
Internet Settings	already configured over all	addresses and over all servi	ces/ports.				
Network Settings	Query						
LAN QoS	View List of SSL VP	N Policies For: Glo	bal 👻				
VPN Settings D	Available Groups:	AD	MIN 👻				
VLAN Settings 🕨 🕨	Available Users:	adn	nin 👻				
DMZ Setup		Disc	Jay				
USB Settings			July				
	List of SSL VPN Policie	S					
	Name Name	Service	Destination	Permission			
		Edit Del	ete Add				

To add a SSL VPN policy, you must first assign it to a user, group, or make it global (i.e. applicable to all SSL VPN users). If the policy is for a group, the available configured groups are shown in a drop down menu and one must be selected. Similarly, for a user defined policy a SSL VPN user must be chosen from the available list of configured users.

The next step is to define the policy details. The policy name is a unique identifier for this rule. The policy can be assigned to a specific Network Resource (details follow in the subsequent section), IP address, IP network, or all devices on the LAN of the controller. Based on the selection of one of these four options, the appropriate configuration fields are required (i.e. choosing the network resources from a list of defined resources, or defining the IP addresses). For applying the policy to addresses the port range/port number can be defined.

The final steps require the policy permission to be set to either permit or deny access to the selected addresses or network resources. As well the policy can be specified for one or all of the supported SSL VPN services (i.e. VPN tunnel) Once defined, the policy goes into effect immediately. The policy name, SSL service it applies to, destination (network resource or IP addresses) and permission (deny/permit) is outlined in a list of configured policies for the controller.

Figure 146: SSL VPN policy configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨	Please Enab	e Remote Management	to activate SSL VPN Co	onfigurations.
WLAN Global Settings	SSL VPN POLICY CON	FIGURATION		
AP Management 🔹 🕨				
WLAN Visualization 🔸	This page allows you to ac	a new SSL VPN Policy or ed	it the configuration of an exis	ang SSL VPN Policy.
Internet Settings	Save Settings	Don't Save Setting	S	
Network Settings	Policy For			
LAN QoS	Policy For:	Glo	bal 👻	
VPN Settings D	Available Groups:	AD	MIN 👻	
VLAN Settings	Available Users:	adr	nin 👻	
DMZ Setup				
USB Settings	SSE VPN Policy			
	Block Icmp:			
	Apply Policy to:	Net	twork Resource 👻	
	Policy Name:			
	IP Address:			
	Mask Length:			
	Port Range / Port Nu	ımber		
	Begin:		(0-65535)	
	End:		(0-65535)	
	Service:	VP	N Tunnel 🚽	

To configure a policy for a single user or group of users, enter the following information:

Policy For: The policy can be assigned to a group of users, a single user, or all users (making it a global policy). To customize the policy for specific users or groups, the user can select from the Available Groups and Available Users drop down.

Apply Policy To: This refers to the LAN resources managed by the DWC-1000, and the policy can provide (or prevent) access to network resources, IP address, IP network, etc.

Policy Name: This field is a unique name for identifying the policy. IP address: Required when the governed resource is identified by its IP address or range of addresses.

Mask Length: Required when the governed resource is identified by a range of addresses within a subnet.

Port Range: If the policy governs a type of traffic, this field is used for defining TCP or UDP port number(s) corresponding to the governed traffic. Leaving the starting and ending port range blank corresponds to all UDP and TCP traffic.

Service: This is the SSL VPN service made available by this policy. The services offered are VPN tunnel, port forwarding or both.

Defined Resources: This policy can provide access to specific network resources. Network resources must be configured in advance of creating the policy to make them available for selection as a defined resource. Network resources are created with the following information

Permission: The assigned resources defined by this policy can be explicitly permitted or denied.

9.2.1 Using Network Resources

Setup > VPN Settings > SSL VPN Server > Resources

Network resources are services or groups of LAN IP addresses that are used to easily create and configure SSL VPN policies. This shortcut saves time when creating similar policies for multiple remote SSL VPN users.

Adding a Network Resource involves creating a unique name to identify the resource and assigning it to one or all of the supported SSL services. Once this is done, editing one of the created network resources allows you to configure the object type (either IP address or IP range) associated with the service. The Network Address, Mask Length, and Port Range/Port Number can all be defined for this

resource as required. A network resource can be defined by configuring the following in the GUI:

Resource Name: A unique identifier name for the resource.

Service: The SSL VPN service corresponding to the resource (VPN tunnel, Port Forwarding or All).

Figure 147: List of configured resources, which are available to assign to SSL VPN policies



9.3 Application Port Forwarding

Setup > VPN Settings > SSL VPN Server > Port Forwarding

Port forwarding allows remote SSL users to access specified network applications or services after they login to the User Portal and launch the Port Forwarding service. Traffic from the remote user to the controller is detected and re-routed based on configured port forwarding rules.

Internal host servers or TCP applications must be specified as being made accessible to remote users. Allowing access to a LAN server requires entering the local server IP

address and TCP port number of the application to be tunnelled. The table below lists some common applications and corresponding TCP port numbers:

TCP Application	Port Number
FTP Data (usually not needed)	20
FTP Control Protocol	21
SSH	22
Telnet	23
SMTP (send mail)	25
HTTP (web)	80
POP3 (receive mail)	110
NTP (netw ork time protocol)	123
Citrix	1494
Terminal Services	3389
VNC (virtual netw ork computing)	5900 or 5800

As a convenience for remote users, the hostname (FQDN) of the network server can be configured to allow for IP address resolution. This host name resolution provides users with easy-to-remember FQDN's to access TCP applications instead of errorprone IP addresses when using the Port Forwarding service through the SSL Us er Portal.

To configure port forwarding, following are required:

Local Server IP address: The IP address of the local server which is hosting the application.

TCP port: The TCP port of the application

Once the new application is defined it is displayed in a list of configured applications for port forwarding.

allow users to access the private network servers by using a hostname instead of an IP address, the FQDN corresponding to the IP address is defined in the port forwarding host configuration section.

Local server IP address: The IP address of the local server hosting the application. The application should be configured in advance.

Fully qualified domain name: The domain name of the internal server is to be specified

Once the new FQDN is configured, it is displayed in a list of configured hosts for port forwarding.

Defining the hostname is optional as minimum requirement for port forwarding is identifying the TCP application and local server IP address. The local server IP address of the configured hostname must match the IP address of the configured application for port forwarding.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Wizard 🕨	Operation succeeded							
WLAN Global Settings	PORT FORWARDING			LOGOUT				
AP Management 🔹 🕨								
WLAN Visualization 🕨	gateway to predefined ap	The Port Forwarding page allows you to detect and re-route data sent from remote users to the SSL VPN gateway to predefined applications running on private networks.						
Internet Settings								
Network Settings	List of Configured Ap	oplications for Port Forv	warding					
LAN QoS	Loc	al Server IP Address	тср	TCP Port Number				
VPN Settings		97.0.0.64		125				
VLAN Settings		Delete	Add					
DMZ Setup	List of Configured Ho	ost Names for Port Forw	varding					
USB Settings	Local Ser	ver IP Address	Fully Qualified Domain Name					
	192.	168.15.25	test					
		Delete	Add					

Figure 148: List of Available Applications for SSL Port Forwarding

9.4 SSL VPN Client Configuration

Setup > VPN Settings > SSL VPN Client > SSL VPN Client

An SSL VPN tunnel client provides a point-to-point connection between the browserside machine and this controller. When a SSL VPN client is launched from the user portal, a "network adapter" with an IP address from the corporate subnet, DNS and WINS settings is automatically created. This allows local applications to access services on the private network without any special network configuration on the remote SSL VPN client machine.

It is important to ensure that the virtual (PPP) interface address of the VPN tunnel client does not conflict with physical devices on the LAN. The IP address range for the SSL VPN virtual network adapter should be either in a different subnet or nonoverlapping range as the corporate LAN. The IP addresses of the client's network interfaces (Ethernet, Wireless, etc.) cannot be identical to the controller's IP address or a server on the corporate LAN that is being accessed through the SSL VPN tunnel.

Figure 149: SSL VPN client adapter and access configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Wizard 🕨								
WLAN Global Settings	SSL VPN CLIENT			LOGOUT				
AP Management 🕨 🕨	An SSL VPN tunnel dient p	rovides a point-to-point conn	ection between the browser	side machine and this				
WLAN Visualization 🔸	device. When a SSL VPN dient is launched from the user portal, a "network adapter" with an IP address, DNS and WINS settings is automatically created, which allows local applications to talk to services on the private							
Internet Settings	network without any spec	network without any special network configuration on the remote SSL VPN dient machine.						
Network Settings	Save Settings	Don't Save Setting:	S					
LAN QoS	Client IP Address Rar	ige						
VPN Settings D	Enable Split Tunne	Support:						
VLAN Settings	DNS Suffix (Optional):						
DMZ Setup	Primary DNS Server	(Ontional) :						
USB Settings	Cocondany DNC Co							
	Secondary DNS Ser	ver (Optional) :						
	Client Address Ran	ge Begin: 192	.168.251.1					
	Client Address Ran	ge End: 192	.168.251.254					
	LCP Timeout:	60	(Seconds)					

The controller allows full tunnel and split tunnel support. Full tunnel mode just sends all traffic from the client across the VPN tunnel to the controller. Split tunnel mode only sends traffic to the private LAN based on pre-specified client routes. These client routes give the SSL client access to specific private networks, thereby allowing access control over specific LAN services.

Client level configuration supports the following:

Enable Split Tunnel Support: With a split tunnel, only resources which are referenced by client routes can be accessed over the VPN tunnel. With full tunnel support (if the split tunnel option is disabled the DWC-1000 acts in full tunnel mode)

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all addresses on the private network are accessible over the VPN tunnel. Client routes are not required.

DNS Suffix: The DNS suffix name which will be given to the SSL VPN client. This configuration is optional.

Primary DNS Server: DNS server IP address to set on the network adaptor created on the client host. This configuration is optional.

Secondary DNS Server: Secondary DNS server IP address to set on the network adaptor created on the client host. This configuration is optional.

Client Address Range Begin: Clients who connect to the tunnel get a DHCP served IP address assigned to the network adaptor from the range of addresses beginning with this IP address

Client Address Range End: The ending IP address of the DHCP range of addresses served to the client network adaptor.

Setup > VPN Settings > SSL VPN Client > Configured Client Routes

If the SSL VPN client is assigned an IP address in a different subnet than the corporate network, a client route must be added to allow access to the private LAN through the VPN tunnel. As well a static route on the private LAN's firewall (typically this controller) is needed to forward private traffic through the VPN Firewall to the remote SSL VPN client. When split tunnel mode is enabled, the user is required to configure routes for VPN tunnel clients:

Destination Network: The network address of the LAN or the subnet information of the destination network from the VPN tunnel clients' perspective is set here.

Subnet Mask: The subnet information of the destination network is set here.

Figure 150: Configured client routes only apply in split tunnel mode

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS			
Wizard 🕨							
Internet Settings	SSL VPN CLIENT ROU	TE CONFIGURATION		LOGOUT			
Wireless Settings 🔹 🕨	The Configured Client Rou	utes entries are the routing er	ntries which will be added by t	the SSL VPN Client such			
Network Settings	that only traffic to these (redirected using the nativ	that only traffic to these destination addresses is redirected through the SSL VPN tunnels. All other traffic is redirected using the native network interface of the hosts (SSL VPN Clients). For example if the SSL VPN Client wishes to access the LAN network, then in SPLIT Tunnel mode you should add the LAN subnet as the Destination Network.					
DMZ Setup	wishes to access the LAN Destination Network.						
VPN Settings	Save Settings	Save Settings Don't Save Settings					
USB Settings							
VLAN Settings 🔹 🕨	SSL VPN Client Route	e Configuration					
	Destination Netwo	rk:					
	Subnet Mask:						

9.4.1 Creating Portal Layouts

Setup > VPN Settings > SSL VPN Server > Portal Layouts

The controller allows you to create a custom page for remote SSL VPN users that is presented upon authentication. There are various fields in the portal that are customizable for the domain, and this allows the controller administrator to communicate details such as login instructions, available services, and other usage details in the portal visible to remote users. During domain setup, configured portal layouts are available to select for all users authenticated by the domain.

The default portal LAN IP address is https://192.168.10.1/scgibin/userPortal/portal. This is the same page that opens when the "User Portal" link is clicked on the SSL VPN menu of the controller GUI.

The controller administrator creates and edits portal layouts from the configuration pages in the SSL VPN menu. The portal name, title, banner name, and banner contents are all customizable to the intended users for this portal. The portal name is appended to the SSL VPN portal URL. As well, the users assigned to this portal (through their authentication domain) can be presented with one or more of the controller's supported SSL services such as the VPN Tunnel page or Port Forwarding page.

To configure a portal layout and theme, following information is needed:

Portal Layout Name: A descriptive name for the custom portal that is being configured. It is used as part of the SSL portal URL.

Portal Site Title: The portal web browser window title that appears when the client accesses this portal. This field is optional.

Banner Title: The banner title that is displayed to SSL VPN clients prior to login. This field is optional.

Banner Message: The banner message that is displayed to SSL VPN clients prior to login. This field is optional.

Display banner message on the login page: The user has the option to either display or hide the banner message in the login page.

HTTP meta tags for cache control: This security feature prevents expired web pages and data from being stored in the client's web browser cache. It is recommended that the user selects this option.

ActiveX web cache cleaner: An ActiveX cache control web cleaner can be pushed from the gateway to the client browser whenever users login to this SSL VPN portal.

SSL VPN portal page to display: The User can either enable VPN tunnel page or Port Forwarding, or both depending on the SSL services to display on this portal.

Once the portal settings are configured, the newly configured portal is added to the list of portal layouts.

Figure 151: SSL VPN Portal configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS				
Wizard 🕨								
Internet Settings 🛛 🕨	PORTAL LAYOUT CON	FIGURATION		LOGOUT				
Wireless Settings 🛛 🕨	This page allows you to ac	ld a new portal layout or edit	the configuration of an exis	ting portal layout. The				
Network Settings 🛛 🕨	details will then be displayed in the List of Portal Layouts table on the SSL VPN Server > Portal Layouts page under the VPN menu.							
DMZ Setup 🕨 🕨	Save Settings Don't Save Settings							
VPN Settings D								
USB Settings	Portal Layout and Th	eme Name						
VLAN Settings 🛛 🕨	Portal Layout Name	e:						
	Portal Site Title (or	otional) :						
	Banner Title (Option	al) :						
	Banner Message (o	ptional) :						
	Display banner mes on login page:	sage 🗌						
	HTTP meta tags for control (recommen	r cache 🛛 🗆 ded):						
	ActiveX web cache	cleaner: 🗌						
	SSL VPN Portal Pages	to Display						
	VPN Tunnel page:	V						
	Port Forwarding:							

9.5 Active VPN Tunnels

The following feature is available upon licensed activation of VPN / Firewall features for the system.

Status > Active VPNs

You can view and change the status (connect or drop) of the controllers IPsec security associations. Here, the active IPsec SAs (security associations) are listed along with the traffic details and tunnel state. The traffic is a cumulative measure of transmitted/received packets since the tunnel was established.

If a VPN policy state is "IPsec SA Not Established", it can be enabled by clicking the Connect button of the corresponding policy. The Active IPsec SAs table displays a list of active IPsec SAs. Table fields are as follows. Policy Name: IKE or VPN policy associated with this SA.

Endpoint: IP address of the remote VPN gateway or client.

Tx (KB): Kilobytes of data transmitted over this SA.

Tx (Packets): Number of IP packets transmitted over this SA.

State: Status of the SA for IKE policies: Not Connected or IPsec SA Established.

Action: Click Connect to establish an inactive SA (connection) or Disconnect to terminate an active SA (connection).

Figure 152: List of current Active VPN Sessions

DWC-1000	SETUP		ADVA	NCED		TOOLS		STA	TUS
Dashboard 🕨 🕨			The pa	qe will auto-	refresh	in 2 seconds			
Global Info 🔶	ACTIVE VPN			-					LOGOUT
Device Info	This page displa	we the active V	DN coppor	tions IDSEC a	e well ar	- 551			
Access Point Info 🔹 🕨	mis page displa	iys ule acuve vi	FIN CONNEC	uons, irsec a	s well as	S 33L.			
LAN Clients Info	Active IPsec	SAs							
Wireless Client Info 🔸	Policy Nam	ie End	point	tx (KB)		tx (Packets)	Sta	ate	Action
Logs 🕨	Active SSL VI	PN Connection	ons						
Traffic Monitor 🔹 🕨	User Name	IP Address	Local	PPP Interfac	e P	Peer PPP Interface	IP	Conne	ect Status
Active Sessions	Active PPTP \	/PN connect	ions						
Active VPNs		Connectio	on Status	;			Action		
	Disconnected								
		Poll Inter	val: 10) (Second	ds)	Start	top		

All active SSL VPN connections, both for VPN tunnel and VPN Port forwarding, are displayed on this page as well. Table fields are as follows.

User Name: The SSL VPN user that has an active tunnel or port forwarding session to this controller.

IP Address: IP address of the remote VPN client.

Local PPP Interface: The interface (Option 1or Option2) through which the session is active.

Peer PPP Interface IP: The assigned IP address of the virtual network adapter.

Connect Status: Status of the SSL connection between this controller and the remote VPN client: Not Connected or Connected.

Chapter 10. Advanced System Functionalities

10.1 USB Device Setup

Setup > USB Settings > USB Status

The DWC-1000 Wireless controller has a USB interface for printer access, file sharing.

- USB Mass Storage: also referred to as a "share port", files on a USB disk connected to the DWC can be accessed by LAN users as a network drive.
- USB Printer: The DWC can provide the LAN with access to printers connected through the USB. The printer driver will have to be installed on the LAN host and traffic will be routed through the DWC between the LAN and printer.

To configure printer on a Windows machine, follow below given steps:

1. Click 'Start' on the desktop.

- 2. Select 'Printers and faxes' option.
- 3. Right click and select 'add printer' or click on 'Add printer' present at the left menu.
- 4. Select the 'Network Printer' radio button and click next (select "device isn't listed in case of Windows7").
- 5. Select the 'Connect to printer using URL' radio button ('Select a shared printer by name 'in case of Windows 7) and give the following URL http://< controller's LAN IP address>:631/printers/<Model Name> (Model Name can be found in the USB status page of controller's GUI).
- 6. Click 'next' and select the appropriate driver from the displayed list.
- 7. Click on 'next' and 'finish' to complete adding the printer.

Figure 153: USB Device Detection

USB SETTINGS		LOGOUT
This page displays information user to do certain configuration	about the USB devices connections on USB devices, such as saf	ted to the USB port(s). This page also allows ely unmounting the devices.
USB-1: Device Not Conne	ected	
\frown	Device Vendor:	NA
	Device Model:	NA
	Device Type:	NA
	Mount Status:	NA
USB-2: Device Not Conne	ected	
\bigcap	Device Vendor:	NA
$\langle 0 \rangle$	Device Model:	NA
	Device Type:	NA
	Mount Status:	NA

10.2 USB Share Port

Setup > USB Settings > USB Status

The DWC-1000 Wireless controller has a USB interface for printer access this page allows you to enable USB device support for both interface USB1 and USB2. It also allows you to enable printer access from a particular VLAN.

Figure 154: USB Share Port

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Wizard 🕨				
WLAN Global Settings	USB SHARE PORT			LOGOUT
AP Management D	Save Settings	Don't Save Settin		
WLAN Visualization 🕨			<u>-</u>	
Internet Settings	USB-1 (NA)			
Network Settings	Enable LICP Drinter			
LAN QoS	Enable 036 Printer	•		
VPN Settings	U5B-2 (NA)			
VLAN Settings	Enable USB Printer	:		
DMZ Setup	Sharing Enabled inte	rfaces		
USB Settings	VLAN N	ame	Enable Pr	inter
	defau	ılt		

10.3 Authentication Certificates

Advanced > Certificates

This gateway uses digital certificates for IPsec VPN authentication as well as SSL validation (for HTTPS and SSL VPN authentication). You can obtain a digital certificate from a well-known Certificate Authority (CA) such as VeriSign, or generate and sign your own certificate using functionality available on this gateway. The gateway comes with a self-signed certificate, and this can be replaced by one signed by a CA as per your networking requirements. A CA certificate provides strong assurance of the server's identity and is a requirement for most corporate network VPN solutions.

The certificates menu allows you to view a list of certificates (both from a CA and self-signed) currently loaded on the gateway. The following certificate data is displayed in the list of Trusted (CA) certificates:

CA Identity (Subject Name): The certificate is issued to this person or organization

Issuer Name: This is the CA name that issued this certificate

Expiry Time: The date after which this Trusted certificate becomes invalid

A self certificate is a certificate issued by a CA identifying your device (or selfsigned if you don't want the identity protection of a CA). The Active Self Certificate table lists the self certificates currently loaded on the gateway. The following information is displayed for each uploaded self certificate:

Name: The name you use to identify this certificate, it is not displayed to IPsec VPN peers or SSL users.

Subject Name: This is the name that will be displayed as the owner of this certificate. This should be your official registered or company name, as IPsec or SSL VPN peers are shown this field.

Serial Number: The serial number is maintained by the CA and used to identify this signed certificate.

Issuer Name: This is the CA name that issued (signed) this certificate

Expiry Time: The date after which this signed certificate becomes invalid – you should renew the certificate before it expires.

To request a self certificate to be signed by a CA, you can generate a Certificate Signing Request from the gateway by entering identification parameters and passing it along to the CA for signing. Once signed, the CA's Trusted Certificate and signed certificate from the CA are uploaded to activate the self-certificate validating the identity of this gateway. The self certificate is then used in IPsec and SSL connections with peers to validate the gateway's authenticity.

Figure 155: Certificate summary for IPsec and HTTPS management

DWC-1000	SETUP	AD	ANCED	TOOLS		STATUS
Global 🕨						
Peer Controllers	CERTIFICATES					LOGOUT
AP Profile	Digital Certificates	(also known as X50) Certificates) are	used to authentica	te the iden	itity of users and
SSIDs	systems, and are i	ssued by Certificatio	n Authorities (CA) such as VeriSign, 1 ternet Key Exchang	Thawte and e (IKE) aut	d other organizations.
WIDS Security	authenticate conne	ecting VPN gateway	s or clients, or to l	be authenticated by	remote er	ntities.
Captive Portal	Trusted Certific	ates (CA Certifi	cate)			
Client		Identity (Subject	:t Name)	Issuer N	lame	Expiry Time
Application Rules			Upload	Delete		
Website Filter 🕨 🕨			opioad	Delete		
Firewall Settings	Active Self Cert	ificates				
IPv6	Name	Subject Name	Serial Nu	imber Iss	uer Name	Expiry Time
Advanced Network 🕨 🕨			Upload	Delete		
Routing	0-16 0	Desusate				
Certificates		Requests	<i>c</i> 1			
Users >		lame	Sta	atus		Action
IP/MAC Binding		Nev	v Self Certifica	ate Delete	•	
Radius Settings						
Controller Settings						
Intel [®] AMT						

10.4 Intet [®]AMT

This feature is available upon licensed activation of VPN / Firewall features for the system.

Advanced > Intet[®]AMT

Intel[®] Active Management Technology enables IT managers to remotely access and manage every networked computing system, even those that lack a working operating system or hard drive, or are turned off as long as the PC/Notebook is connected to line power and to the network even if PC/Notebook is off or OS is crashed. Intel[®] AMT uses a separate management processor that runs independently on the client machine and can be reached through the wired or wireless network. With D-Link DSR

Routers, Intel[®] AMT Technology could cross Internet seamlessly and it's an ideal solution to help IT managers for asset management over Internet..

Figure 156: Intet [®]AMT

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global D				
Peer Controllers	INTEL [®] AMT			LOGOUT
AP Profile	This page allows you to a	configure Intel [®] AMT servic	е,	
SSIDs	Save Settings	Don't Save Setting	Js	
WIDS Security				
Captive Portal	Intel [®] AMT			
Client	Enable Ports:			
Application Rules	Option Hosts:	AN	Y 👻	
Website Filter 🕨 🕨	Option Host Addre	ssses:		
Firewall Settings	Internal IP Addres	s:		
IPv6 ►	Intel [®] AMT Reflector	*		
Advanced Network 🕨	Enable Intel Amt R	eflector		
Routing 🕨	Redirect to Port 16	5992:		
Certificates	Listen on Port:	169	92	
Users 🕨	Redirect to Port 16	5993:		
IP/MAC Binding	Listen on Port:	169	93	
Radius Settings	Redirect to Port 16	5994.		
Switch Settings	Listen on Port:	160	004	
Intel [®] AMT	Redirect to Port 16	5005.		
	Listen on Port	100	0.5	
	Dedirect to Port		155	
	Redirect to Port 99	9/1: V		
	Listen on Port:	997	71	

Enable Ports: When enabled, inbound/outbound firewall rules are added for certain ports to enable Intel® AMT service.

Option Hosts: If the user selects ANY, all Option side hosts are granted access to the local server. If the user selects "Specify Option IPs", he must provide a comma

separated list of Option host addresses that are to be allowed access to the Local Server (LAN Host).

Option Host Addresses: The user must provide a comma separated list of Option IP addresses that must be allowed access to the Local Server in case he has selected "Specify Option IPs" in the Drop down menu. Only commas are allowed and there should be no spaces between the comma and the IP address

Internal IP Address: The user must provide a single IP address of the LAN host (Local Server).

Enable Intel® Amt Reflector: Check this box to reflect back the data on selected ports to the client initiating the connection.

Redirect to Port 16992: Check this box to redirect to port 16992 of the client initiating the connection.

Listen on Port: Enter the port on which server should listen for incoming connections.

Redirect to Port 16993: Check this box to redirect to port 16993 of the client initiating the connection.

Listen on Port: Enter the port on which server should listen for incoming connections.

Redirect to Port 16994: Check this box to redirect to port 16994 of the client initiating the connection.

Listen on Port: Enter the port on which server should listen for incoming connections.

Redirect to Port 16995: Check this box to redirect to port 16995 of the client initiating the connection.

Listen on Port: Enter the port on which server should listen for incoming connections.

Redirect to Port 9971: Check this box to redirect to port 9971 of the client initiating the connection.

Listen on Port: Enter the port on which server should listen for incoming connections.

Chapter 11. Advanced Wireless Controller Features

11.1 Advanced Global Wireless Controller Configuration

Advanced > Global > General

The fields on the advanced Wireless Global Configuration page are settings that apply to the DWC-1000 Wireless Controller.

Figure	157:	Wireless	Configu	ration
--------	------	----------	---------	--------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global D				
Peer Controllers	CONFIGURATION ITEMS			LOGOUT
AP Profile	The fields on this page are setting	e that apply to the l	Unified Wireless controlles	
SSIDs	rne neus on uns page are setung	is that apply to the t	onned wireless controller.	
WIDS Security	Submit Don't Save	Settings		
Captive Portal				
Client	Wireless Configuration			
Application Rules	Peer Group ID	1	(1 to 255)	
Website Filter 🔹 🕨	Client Been Treesut	· 20	(1 0 235)	
Firewall Settings	Client Roam Timeout	30	(1 to 120 Seconds)	
IPv6 ►	Ad Hoc Client Status Timeout	24	(0 to 168 Hours)	
Advanced Network	AP Failure Status Timeout	24	(0 to 168 Hours)	
Routing 🕨	MAC Authentication Mode	white-list 👻		
Certificates	RF Scan Status Timeout	24	(0 to 168 Hours)	
Users 🕨	Detected Clients Status Timeout	24	(0 to 168 Hours)	
IP/MAC Binding	Tunnel IP MTU Size	1500 👻		
Radius Settings	Cluster Priority	1	(0 to 255, 0 - Disable)	
Switch Settings	AP Client QoS	Disable 👻		
Intel [®] AMT				

Peer Group ID: In order to support larger networks, you can configure wireless controllers as peers, with up to 8 controllers in a cluster (peer group). Peer controllers share some information about APs and allow L3 roaming among them.Peers are grouped according to the Group ID.

Client Roam Timeout: This value determines how long to keep an entry in the Associated Client Status list after a client has disassociated. Each entry in the status list shows an age, and when the age reaches the value you configure in the timeout field, the entry is deleted.

Ad Hoc Client Status Timeout: This value determines how long to keep an entry in the Ad Hoc Client Status list. Each entry in the status list shows an age, and when the age reaches the value you configure in the timeout field, the entry is deleted. **AP Failure Status Timeout**: This value determines how long to keep an entry in the AP Authentication Failure Status list. Each entry in the status list shows an age, and when the age reaches the value you configure in the timeout field, the entry is deleted.

MAC Authentication Mode: Select the global action to take on wireless clients in the white-list: Select this option to specify that any wireless clients with MAC addresses that are specified in the Known Client database, and are not explicitly denied access, are granted access. If the MAC address is not in the database then the access to the client is denied.

Detected Clients Status Timeout: This value determines how long to keep an entry in the Detected Client Status list. Each entry in the status list shows an age, and when the age reaches the value you configure in the timeout field, the entry is deleted.

Tunnel IP MTU Size: Select the maximum size of an IP packet handled by the network. The MTU is enforced only on tunneled VAPs. When IP packets are tunneled between the APs and the Unified Wireless controller, the packet size is increased by 20 bytes during transit. This means that clients configured for 1500 byte IP MTU size may exceed the maximum MTU size of existing network infrastructure which is set up to controller and route 1518 (1522tagged) byte frames. If you increase the tunnel IP MTU size, you must also increase the physical MTU of the ports on which the traffic flows. Note: f any of the following conditions are true, you do not need to increase the tunnel IP MTU size: The wireless network does not use L3 tunneling. The tunneling mode is used only for voice traffic, which typically has small packets. The tunneling mode is used only for TCP based protocols, such as HTTP. This is because the AP automatically reduces the maximum segment size for all TCP connections to fit within the tunnel.

Cluster Priority: Specify the priority of this controller for the Cluster Controller election. The controller with highest priority in a cluster becomes the Cluster Controller. If the priority is the same for all controllers, then the controller with lowest IP address becomes the Cluster Controller. A priority of 0 means that the controller cannot become the Cluster Controller. The highest possible priority is 255.

AP Client QoS: Enable or disable the client QoS feature. If AP Client QoS is disabled, the Client QoS configuration remains in place, but any ACLs or DiffServ policies applied to wireless traffic are not enforced.

The Client QoS feature extends the primary QoS capabilities of the Unified Wireless controller to the wireless domain. More specifically, access control lists (ACLs) and differentiated service (DiffServ) policies are applied to wireless clients associated to the AP.the maximum MTU size of existing network infrastructure which is set up to controller and route 1518 (1522-tagged) byte frames. If you increase the tunnel IP MTU size, you must also increase the physical MTU of the ports on which the traffic flows.

11.2 Distributed Tunneling

Advanced > Global > Distributed Tunneling

The Distributed Tunneling mode, also known as AP-AP tunneling mode, is used to support L3 roaming for wireless clients without forwarding any data traffic to the wireless controller. In the AP-AP tunneling mode, when a client first associates with an AP in the wireless system the AP forwards its data using the VLAN forwarding mode. The AP to which the client initially associates is the Home AP. The AP to which the client roams is the Association AP.

Figure	158:	Distributed	Tunneling
--------	------	--------------------	-----------

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global D				
Peer Controllers	DISTRIBUTED TUNNER	LING		LOGOUT
AP Profile	Description goes here			
SSIDs	beschption goes here			
WIDS Security	Submit Don't	Save Settings		
Captive Portal				
Client	Distributed Tunneling	g Configuration		
Application Rules	Distributed Tunne	el Clients 12	8	(1 to 8000)
Website Filter 🕨 🕨	Distributed Tunne	el Idle Timeout 12	0	(30 to 3600)
Firewall Settings	Distributed Tunne	el Timeout 72	00	(30 to 86400)
IPv6 ►	Distributed Tunne	el Max Multicast	0	(1 to 1024)
Advanced Network	Replications Allow	ved 12	.0	(1 00 1027)
Routing				

Distributed Tunnel Clients: Specify the maximum number of distributed tunneling clients that can roam away from the Home AP at the same time.

Distributed Tunnel Idle Timeout: Specify the number of seconds of no activity by the client before the tunnel to that client is terminated and the client is forced to change its IP address.

Distributed Tunnel Timeout: Specify the number of seconds before the tunnel to the roamed client is terminated and the client is forced to change its IP address.

Distributed Tunnel Max Multicast Replications Allowed: Specify the maximum number of tunnels to which a multicast frame is copied on the Home AP.

11.3 Distributed Tunneling Status

Status > Dashboard > Distributed Tunneling

This page shows information about all the distributed tunnel clients.

Access Point Info	
LAN Clients Info	Distributed Tunnel - Bar Graph
Wireless Client Info 🕨	4.0 Distributed Tunnel
Logs 🕨 🕨	Distributed Tunnel
Traffic Monitor 🛛 🕨	3.0 Clients :1
Active Sessions	Client Denials :0
Active VPNs	
	No.of tunnels 2.0
	1.0
	0.0
	Types of tunnel
	Distributed Tunneling - Data
	Distributed Tunnel Packets 4 Transmitted:
	Distributed Tunnel Roamed Clients: 4
	Distributed Tunnel Clients: 1
	Distributed Tunnel Client Denials: 0

Figure 159: Distributed Tunneling Clients

Distributed Tunnel Packets: Transmitted: Total number of packets sent by all APs via distributed tunnels.

Distributed Tunnel Roamed Clients: Total number of clients that successfully roamed away from Home AP using distributed tunneling.

Distributed Tunnel Clients: Total number of clients that are associated with an AP that are using distributed tunneling.

Distributed Tunnel Client Denials: Total number of clients for which the system was unable to set up a distributed tunnel when client roamed.

11.4 Peer Controller Configuration

11.4.1 Peer Controller Configuration Request Status

Advanced > Peer Controller > Configuration Request Status

The Peer Controller Configuration feature allows you to send a variety of configuration information from one controller to all other controllers. In addition to keeping the controllers synchronized, this function allows you to manage all wireless controllers in the cluster from one controller. The Peer Controller Configuration Request Status page provides information about the status of the configuration upgrade on the controllers in the cluster

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers D	CONFIGURATION REQ	UEST		LOGOUT
AP Profile	The Peer Controller Con	figuration Request Status pa	de provides information abo	ut the status of the
SSIDs	configuration upgrade o	n the controllers in the clust	er.	
WIDS Security 🕨 🕨	Peer Controller Confi	guration Request Stat	tus	
Captive Portal	Configuration Requ	uest Status: Not	Started	
Client	Total Count:	0		
Application Rules	Success Count:	0		
Website Filter 🔹 🕨	Failure Count:	0		
Firewall Settings 🔹 🕨	List of Peers			
IPv6 ►		No data available fo	or peer switch status.	
Advanced Network		Ref	resh	
Routing >				

Figure 160: Peer Controller Configuration Request Status

Peer Controller Configuration Request Status:

Configuration Request Status: Indicates the global status for a configuration push operation to one or more peer controllers. The status can be one of the following:

- Not Started.
- Receiving Configuration.
- Saving Configuration.
- Success. Failure Invalid Code Version.
- Failure Invalid Hardware Version.
- Failure Invalid Configuration

Total Count: Indicates the number of peer controllers included at the time a configuration download request is started, the value is 1 if a download request is for a single controller.

Success Count: Indicates the total number of peer controllers that have successfully completed a configuration download.

Failure Count: Indicates the total number of peer controllers that have failed to complete a configuration download.

List of Peers Peer IP Address: Lists the IP address of each controller in the cluster and indicates the configuration request status of that controller.

11.4.2 Peer Controller Configuration

Advanced > Peer Controller > Configuration Items

The Peer Controller Configuration itesm pages allows to Enable/Disable allows you to select which parts of the configuration to copy to one

Figure 161: Peer Controller Configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers 🛛 🖒	CONFIGURATION ITEM	IS		LOGOUT
AP Profile	The Beer Centreller Con			·
SSIDs	or more peer controller	s in the group.	elect which parts of the conf	iguration to copy to one
WIDS Security 🕨 🕨	Cubmit Don	t Sava Sattinga		
Captive Portal 🛛 🕨		t Save Settings		
Client	Peer Controller Conf	guration		
Application Rules 🛛 🕨		-		
Website Filter 🔹 🕨	Global	Enable 🔻		
Firewall Settings 🛛 🕨	Discovery	Disable 🔻		
IPv6	Channel/Power	Enable 🔻		
Advanced Network 🔹 🕨	AP Database	Enable 🔻		
Routing 🕨 🕨	AP Profiles			
Certificates	Kernes	Enable +		
Users 🕨	Known Client	Enable V		
IP/MAC Binding	RADIUS Client	Enable 🔻		

Global: Enable this field to include the basic and advanced global settings in the configuration that the controller pushes to its peers. The configuration does not include the controller IP address since that is a unique setting.

Discovery: Enable this field to include the L2 and L3 discovery information, including the VLAN list and IP list, in the configuration that the controller pushes to its peers.

Channel/Power: Enable this field to include the RF management information in the configuration that the controller pushes to its peers.

AP Database: Enable this field to include the AP Database in the configuration that the controller pushes to its peers.

AP Profiles: Enable this field to include all AP profiles in the configuration that the controller pushes to its peers. The AP profile includes the global AP settings, such as the hardware type, Radio settings, VAP and Wireless Network settings, and QoS settings.

Known Client: Enable this field to include the Known Client Database in theconfigurationthatthecontrollerpushestoitspeers.RADIUSClient: Enable this field to include the Client RADIUS information in theconfiguration that the controller pushes to its peers.

11.5 WIDS Configuration

The D-Link Wireless Controller Wireless Intrusion Detection System (WIDS) can help detect intrusion attempts into the wireless network and take automatic actions to protect the network.

11.5.1 WIDS AP configration

Advanced > WIDS Security > AP

The WIDS AP Configuration page allows you to activate or deactivate various threat detection tests and set threat detection thresholds in order to help detect rogue APs on the wireless network. These changes can be done without disrupting network connectivity. Since some of the work is done by access points, the controller needs to send messages to the APs to modify its WIDS operational properties

Administrator configured rogue AP: If the source MAC address is in the valid-AP database on the controller or on the RADIUS server and the AP type is marked as Rogue, then the AP state is Rogue.

Managed SSID from an unknown AP: This test checks whether an unknown AP is using the managed network SSID. A hacker may set up an AP with managed SSID to fool users into associating with the AP and revealing password and other secure information. Administrators with large networks who are using multiple clusters

should either use different network names in each cluster or disable this test. Otherwise, if an AP in the first cluster detects APs in the second cluster transmitting the same SSID as APs in the first cluster then these APs are reported as rogues. **Managed SSID from a fake managed AP**: A hacker may set up an AP with the same MAC address as one of the managed APs and configure it to send one of the managed SSIDs. This test checks for a vendor field in the beacons which is always transmitted by managed APs. If the vendor field is not present, then the AP is identified as a fake AP.

AP without an SSID: SSID is an optional field in beacon frames. To avoid detection a hacker may set up an AP with the managed network SSID, but disable SSID transmission in the beacon frames. The AP would still send probe responses to clients that send probe requests for the managed SSID fooling the clients into associating with the hacker's AP. This test detects and flags APs that transmit beacons without the SSID field. The test is automatically disabled if any of the radios in the profiles are configured not to send SSID field, which is not recommended because it does not provide any real security and disables this test.

Fake managed AP on an invalid channel: This test detects rogue APs that transmit beacons from the source MAC address of one of the managed APs, but on different channel from which the AP is supposed to be operating.

Managed SSID detected with incorrect security: During RF Scan the AP examines beacon frames received from other APs and determines whether the detected AP is advertising an open network, WEP, or WPA. If the SSID reported in the RF Scan is one of the managed networks and its configured security not match the detected security then this test marks the AP as rogue.

Invalid SSID from a managed AP: This test checks whether a known managed AP is sending an unexpected SSID. The SSID reported in the RF Scan is compared to the list of all configured SSIDs that are used by the profile assigned to the managed AP. If the detected SSID doesn't match any configured SSID then the AP is marked as rogue.

AP is operating on an illegal channel: The purpose of this test is to detect hackers or incorrectly configured devices that are operating on channels that are not legal in the country where the wireless system is set up. Note: In order for the wireless system to detect this threat, the wireless network must contain one or more radios that operate in sentry mode.

Standalone AP with unexpected configuration: If the AP is classified as a known standalone AP, then the controller checks whether the AP is operating with the expected configuration parameters. You configure the expected parameters for the

standalone AP in the local or RADIUS Valid AP database. This test may detect network misconfiguration as well as potential intrusion attempts. The following parameters are checked:

- Channel Number
- SSID
- Security Mode
- WDS Mode.
- Presence on a wired network.

Unexpected WDS device detected on network: If the AP is classified as a Managed or Unknown AP and wireless distribution system (WDS) traffic is detected on the AP, then the AP is considered to be Rogue. Only stand-alone APs that are explicitly allowed to operate in WDS mode are not reported as rogues by this test.

Unmanaged AP detected on wired network: This test checks whether the AP is detected on the wired network. If the AP state is Unknown, then the test changes the AP state to Rogue. The flag indicating whether AP is detected on the wired network is reported as part of the RF Scan report. If AP is managed and is detected

on the network then the controller simply reports this fact and doesn't change the AP state to Rogue. In order for the wireless system to detect this threat, the wireless network must contain one or more radios that operate in sentry mode

Rogue Detected Trap Interval: Specify the interval, in seconds, between transmissions of the SNMP trap telling the administrator that rogue APs are present in the RF Scan database. If you set the value to 0, the trap is never sent.

Wired Network Detection Interval: Specify the number of seconds that the AP waits before starting a new wired network detection cycle. If you set the value to 0, wired network detection is disabled

AP De-Authentication Attack: Enable or disable the AP de-authentication attack. The wireless controller can protect against rogue APs by sending DE authentication

messages to the rogue AP. The de-authentication attack feature must be globally enabled in order for the wireless system to do this function. Make sure that no
legitimate APs are classified as rogues before enabling the attack feature. This feature is disabled by default.

Figure 162: WIDS AP Configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS		
Global 🕨						
Peer Controllers	WIDS AP CONFIGURA	TION		LOGOUT		
AP Profile	The MEDE AD Conference			and data the bade and		
SSIDs	The WIDS AP Configuration page allows you to activate or deactivate various threat detection tests and set threat detection thresholds in order to help detect rogue APs on the wireless network. These changes					
WIDS Security 🛛 🖒	the controller needs to se	opting network connectivities of messages to the APs to	y. Since some of the work is modify its WIDS operational	s done by access points, properties,		
Captive Portal	Submit Don't	Save Settings				
Client						
Application Rules	WIDS AP Configurati	on				
Website Filter	Administrator con	figured rogue AP Enab	ble			
Firewall Settings	Managed SSID from	m an unknown				
IPv6 ►	AP	En	able 🔻			
Advanced Network	Managed SSID from managed AP	m a fake	able 👻			
Routing	AP without an SSII	En:	able 🔻			
Certificates	Fake managed AP	on an invalid	able 🔻			
Users 🕨	channel					
IP/MAC Binding	Managed SSID det incorrect security	ected with En	able 👻			
Radius Settings	Invalid SSID from	a managed AP En	able 👻			
Switch Settings	AP is operating on	an illegal	able -			
Intel [®] AMT	channel	En				
	Standalone AP wit configuration	h unexpected En	able 🔻			
	Unexpected WDS of on network	levice detected En	able 🔻			
	Unmanaged AP de	tected on wired				

11.5.2 WIDS Client Configuration

Advanced > WIDS Security > Client

The settings you configure on the WIDS Client Configuration page help determine whether a detected client is classified as a rogue. Clients classified as rogues are considered to be a threat to network security

The WIDS feature tracks the following types of management messages that each detected client sends:

- Probe Requests
- 802.11 Authentication Requests
- 802.11 De-Authentication Requests.

In order to help determine whether a client is posing a threat to the network by flooding the network with management traffic, the system keeps track of the number of times the AP received each message type and the highest message rate detected in a single RF Scan report. On the WIDS Client Configuration page, you can set thresholds for each type of message sent, and the APs monitor whether any clients exceed those thresholds or tests.

Not Present in OUI Database Test: This test checks whether the MAC address of the client is from a registered manufacturer identified in the OUI database.

Known Client Database Test: This test checks whether the client, which is identified by its MAC address, is listed in the Known Client Database and is allowed access to the AP either through the Authentication Action of Grant or through the White List global action. If the client is in the Known Client Database and has an action of Deny, or if the action is Global Action and it is globally set to Black List, the client fails this test.

Configured Authentication Rate Test: This test checks whether the client has exceeded the configured rate for transmitting 802.11 authentication requests.

Configured Probe Requests Rate Test: This test checks whether the client has exceeded the configured rate for transmitting probe requests.

Configured De-Authentication Requests Rate Test: This test checks whether the client has exceeded the configured rate for transmitting de-authentication requests.

Maximum Authentication Failures Test: This test checks whether the client has exceeded the maximum number of failed authentications.

Authentication with Unknown AP Test: This test checks whether a client in the Known Client database is authenticated with an unknown AP.

Client Threat Mitigation: Select enable to send de-authentication messages to clients that are in the Known Clients database but are associated with unknown APs. The Authentication with Unknown AP Test must also be enabled in order for the mitigation to take place. Select disable to allow clients in the Known Clients database to remain authenticated with an unknown AP. **Known Client Database Lookup Method**: When the controller detects a client on the network it performs a lookup in the Known Client database. Specify whether the controller should use the local or RADIUS database for these lookups.

Known Client Database RADIUS Server Name: If the known client database lookup method is RADIUS then this field specifies the RADIUS server name.

Rogue Detected Trap Interval: Specify the interval, in seconds, between transmissions of the SNMP trap telling the administrator that rogue APs are present in the RF Scan database. If you set the value to 0, the trap is never sent.

De-Authentication Requests Threshold Interval: Specify the number of seconds an AP should spend counting the DE authentication messages sent by wireless clients.

De-Authentication Requests Threshold Value: If controller receives more than specified messages during the threshold interval the test triggers.

Authentication Requests Threshold Interval: Specify the number of seconds an AP should spend counting the authentication messages sent by wireless clients.

Authentication Requests Threshold Value: If controller receives more than specified messages during the threshold interval the test triggers. Probe Requests Threshold Interval Specify the number of seconds an AP should spend counting the probe messages sent by wireless clients.

Probe Requests Threshold Value: Specify the number of probe requests a wireless client is allowed to send during the threshold interval before the event is reported as a threat.

Authentication Failure Threshold Value: Specify the number of 802.1X authentication failures a client is allowed to have before the event is reported as a threat.

Figure 163: WIDS Client Configuration

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Global 🕨				
Peer Controllers	WIDS CLIENT CONFIG	URATION		LOGOUT
AP Profile			· · · · · · · · ·	
SSIDs	client is classified as a rog	ue. Clients classified as rog	riguration page help determinues are considered to be a th	reat to network security.
WIDS Security 🛛 👂	Submit Refres	h		
Captive Portal				
Client	wibs client Configur	ацоп		
Application Rules	Enable Not Presen	t in OUT		
Website Filter 🕨 🕨	Database Test	Di	sable 🔻	
Firewall Settings	Enable Not Presen	t in Known Client	sable 🔻	
IPv6 ►	Database Test			
Advanced Network	Enable Configured Rate Test	Authentication	able 🔻	
Routing ▶	Enable Configured	Probe Requests	able -	
Certificates	Rate Test			
Users >	Enable Configured De-Authentication	Requests Rate	able 🔻	
IP/MAC Binding	Test			
Radius Settings	Enable Maximum /	Authentication Er	able 👻	
Switch Settings		ting with		
Intel [®] AMT	Unknown AP Test	Di	sable 🔻	
	Enable Client Thre	at Mitigation Di	sable 🔻	
	Enable Known Clier Lookup Method	nt Database	cal 🔻	

Chapter 12. Administration & Management

12.1 Remote Management

Both HTTPS and telnet access can be restricted to a subset of IP address es. The controller administrator can define a known PC, single IP address or range of IP addresses that are allowed to access the GUI with HTTPS. The opened port for SSL traffic can be changed from the default of 443 at the same time as defining the allowed remote management IP address range.

Figure 164: Remote Management

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS			
Admin D							
Date and Time	REMOTE MANAGEMEN	REMOTE MANAGEMENT LOGOUT					
Log Settings 🔶	From this page a user can	configure the remote manage	ement feature. This feature o	an be used to manage			
System							
Firmware	Save Settings	Don't Save Settings	3				
Firmware via USB	Remote Management	: Enable					
Dynamic DNS	Enable Remote Ma	nagement: 🛛 🔽					
System Check	Enable Remote SSI	ł: 🕅					
Schedules	Access Type:	All I	P Addresses 👻				
License	From:						
	To:						
	IP Address:						
	HTTPS Port Numbe	r: 443					
	Enable Remote SNI	MP:					

12.2 CLI Access

In addition to the web-based GUI, the gateway supports SSH and Telnet management for command-line interaction. The CLI login credentials are shared

with the GUI for administrator users. To access the CLI, type "cli" in the SSH or console prompt and login with administrator user credentials.

12.3 SNMP Configuration

Tools > Admin > SNMP

SNMP is an additional management tool that is useful when multiple controller in a network are being managed by a central Master system. When an external SNMP manager is provided with this controller Management Information Base (MIB) file, the manager can update the controller hierarchal variables to view or update configuration parameters. The controller as a managed device has an SNMP agent that allows the MIB configuration variables to be accessed by the Master (the SNMP manager). The Access Control List on the controller identifies managers in the network that have read-only or read-write SNMP credentials. The Traps List outlines the port over which notifications from this controller are provided to the SNMP community (managers) and also the SNMP version (v1, v2c, v3) for the trap.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin D				
Date and Time	SNMP			LOGOUT
Log Settings 🔶	Simple Network Manageme	ent Protocol (SNMP) lets you m	onitor and manage your rou	iter from an SNMP
System	configurations, statistics of	a remote means to monitor and collection, performance, and se	d control network devices, a curity.	nd to manage
Firmware	SNMP v3 Users List			
Firmware via USB	Name	Privilege	Sec	urity level
Dynamic DNS	admin	RWUSER	No	AuthNoPriv
System Check	guest	ROUSER	No/	AuthNoPriv
Schedules		Ed	it	
License				
	Traps List			
	IP Address	Port 0	Community	SNMP Version
		Edit Dele	Ad d	
	Access Control List			
	IP Address	Subnet Mask	Community	Access Type
		Edit Dele	Add Add	

Figure 165: SNMP Users, Traps, and Access Control

Tools > Admin > SNMP System Info

The controller is identified by an SNMP manager via the System Information. The identifier settings The SysName set here is also used to identify the controller for SysLog logging.

Figure 166: SNMP system information for this controller

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS		
Admin D						
Date and Time	SNMP			LOGOUT		
Log Settings 🕨 🕨	This page displays the cur	rent SNMP configuration of th	e router. The following MIB (Management Information		
System	Base) fields are displayed	Base) fields are displayed and can be modified here.				
Firmware	Save Settings	Don't Save Setting	8			
Firmware via USB	SNMP System Inform	ation				
Dynamic DNS	SysContact:					
System Check	SysLocation:					
Schedules	SycNamo:	DW	/C-1000			
License	Systame.		0.1000			

12.4 SNMP Traps

Advanced > Global > SNMP Traps

If you use Simple Network Management Protocol (SNMP) to manage the DWC-1000 wireless controller, you can configure the SNMP agent on the controller to send traps to the SNMP manager on your network. When an AP is managed by a controller, it does not send out any traps. The controller generates all SNMP traps based on its own events and the events it learns about through updates from the APs it manages.

Figure 167: SNMP Traps

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin D				
Date and Time	SNMP			LOGOUT
Log Settings 🔶	Simple Network Managem	ent Protocol (SNMP) lets you m	onitor and manage your rou	iter from an SNMP
System	configurations, statistics of	a remote means to monitor and collection, performance, and se	control network devices, a curity.	nd to manage
Firmware	SNMP v3 Users List			
Firmware via USB	Name	Privilege	Sec	urity level
Dynamic DNS	admin	RWUSER	No/	AuthNoPriv
System Check	guest	ROUSER	No/	AuthNoPriv
Schedules		Edi	t	
License				
	Traps List			
	IP Address	Port C	ommunity	SNMP Version
		Edit Dele	Add	
	Access Control List			
	IP Address	Subnet Mask	Community	Access Type
		Edit Dele	Add	

AP Failure Traps: If you enable this field, the SNMP agent sends a trap if an AP fails to associate or authenticate with the controller.

AP State Change Traps: If you enable this field, the SNMP agent sends a trap for one of the following reasons:

- Managed AP Discovered
- Managed AP Failed
- Managed AP Unknown Protocol Discovered.
- Managed AP Load Balancing Utilization Exceeded.

Client Failure Traps: If you enable this field, the SNMP agent sends a trap if a wireless client fails to associate or authenticate with an AP that is managed by the controller.

Client State Change Traps: If you enable this field, the SNMP agent sends a trap for one of the following reasons associated with the wireless client:

- Client Association Detected.
- Client Disassociation Detected.
- Client Roam Detected.

Peer Controller Traps: If you enable this field, the SNMP agent sends a trap for one of the following reasons associated with a peer controller.

- Peer Controller Discovered
- Peer Controller Failed
- Peer Controller Unknown Protocol Discovered.

Configuration command received from peer controller. (The controller need not be Cluster Controller for generating this trap.

RF Scan Traps: If you enable this field, the SNMP agent sends a trap when the RF scan detects a new AP, wireless client, or ad-hoc client.

Rogue AP Traps: If you enable this field, the SNMP agent sends a trap when the controller discovers a rogue AP. The agent also sends a trap every Rogue Detected Trap Interval seconds if any rogue AP continues to be present in the network.

Wireless Status Traps: If you enable this field, the SNMP agent sends a trap if the operational status of the Unified Wireless controller (it need not be Cluster Controller for this trap) changes. It sends a trap if the Channel Algorithm is complete or the Power Algorithm is complete. It also sends a trap if any of the following databases or lists has reached the maximum number of entries:

- 1- Managed AP database.
- 2- AP Neighbor List.
- 3- Client Neighbor List.
- 4- AP Authentication Failure List.
- 5- RF Scan AP List.
- 6- Client Association Database.
- 7- Ad Hoc Clients List.

8- Detected Clients List.

12.5 Configuring Time Zone and NTP

Tools > Date and Time

You can configure your time zone, whether or not to adjust for Daylight Savings Time, and with which Network Time Protocol (NTP) server to synchronize the date and time. You can choose to set Date and Time manually, which will store the information on the controller real time clock (RTC). If the controller has access to the internet, the most accurate mechanism to set the controller time is to enable NTP server communication.

Accurate date and time on the controller is critical for firewall schedules, Wi-Fi power saving support to disable APs at certain times of the day, and accurate logging.

Please follow the steps below to configure the NTP server:

- 1. Select the controller time zone, relative to Greenwich Mean Time (GMT).
- 2. If supported for your region, click to Enable Daylight Savings.
- **3.** Determine whether to use default or customNetwork Time Protocol (NTP) servers. If custom, enter the server addresses or FQDN.

Figure 168: Date, Time, and NTP server setup

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS		
Admin 🕨						
Date and Time	DATE AND TIME			LOGOUT		
Log Settings 🔹 🕨	This page allows us to se	t the date, time and NTP services and the service of the services of the service of the service of the services of the service	vers. Network Time Protoco	ol (NTP) is a protocol that		
System	important for many reas	ons.	ork of computers. Accurate	e time across a network is		
Firmware	Save Settings Don't Save Settings					
Firmware via USB	Date and Time					
Dynamic DNS	Current Pouter Tin	ne: Eri Oct 7 05:25:	08 CMT 2011			
System Check	Time Zoner	(CMT 08:00) P-				
Schedules	Fine Zone:	(GM1-06:00) Pac	mc lime (US and Canada)			
License	Configure NTR Com	iving:				
	Configure wire Serv	vers. 🍯				
	Manually:	0				
	NTP Servers Configu	ration				
	Default NTP Serve	r: ()				
	Custom NTP Serve	r: 🔘				
	Primary NTP Serve	0.u	s.pool.ntp.org			
	Secondary NTP Set	rver: 1.u	s.pool.ntp.org			
	Time to re-synchro minutes):	onize (in	D			
	Set Date And Time					
	Year Month Day 2011 / 10 / 07	Hours Min Sec - 05 : 25 : 08				

12.6 Log Configuration

This controller allows you to capture log messages for traffic through the firewall, VPN, and over the wireless AP. As an administrator you can monitor the type of traffic that goes through the controller and also be notified of potential attacks or errors when they are detected by the controller. The following sections describe the log configuration settings and the ways you can access these logs.

12.6.1 Defining What to Log

Tools > Log Settings > Logs Facility

The Logs Facility page allows you to determine the granularity of logs to receive from the controller. There are three core components of the controller, referred to as Facilities:

Kernel: This refers to the Linux kernel. Log messages that correspond to this facility would correspond to traffic through the firewall or network stack.

System: This refers to application and management level features available on this controller, including SSL VPN and administrator changes for managing the unit.

Wireless: This facility corresponds to the 802.11 driver used for providing AP functionality to your network.

Local1-UTM: This facility corresponds to IPS (Intrusion Prevention System) which helps in detecting malicious intrusion attempts from the Option.

For each facility, the following events (in order of severity) can be logged: Emergency, Alert, Critical, Error, Warning, Notification, Information, Debugging. When a particular severity level is selected, all events with severity equal to and greater than the chosen severity are captured. For example if you have configured CRITICAL level logging for the Wireless facility, then 802.11 logs with severities CRITICAL, ALERT, and EMERGENCY are logged. The severity levels available for logging are:

- EMERGENCY: system is unusable
- ALERT: action must be taken immediately
- CRITICAL: critical conditions
- ERROR: error conditions
- WARNING: warning conditions
- NOTIFICATION: normal but significant condition
- INFORMATION: informational
- DEBUGGING: debug-level messages

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS	
Admin 🕨					
Date and Time	LOGS FACILITY			LOGOUT	
Log Settings D	This page allows user to and settings depending u	set the date and time for the	router. User can use the au	tomatic or manual date	
System	Save Settings	Dea't Save Setting	-		
Firmware	Save Settings	Don't Save Setting	13		
Firmware via USB	Logs Facility				
Dynamic DNS	Facility: System 👻				
System Check	Display				
Schedules	Display and Send Log	gs			
License		Display in Event Log	Send to Syslog		
	Emergency:				
	Alert:				
	Critical:				
	Error:				
	Warning:				
	Notification:				
	Information:				
	Debugging:				

Figure 169: Facility settings for Logging

The display for logging can be customized based on where the logs are sent, either the Event Log viewer in the GUI (the Event Log viewer is in the *Status* > *Logs* page) or a remote Syslog server for later review. E-mail logs, discussed in a subsequent section, follow the same configuration as logs configured for a Syslog server.

Tools > Log Settings > Logs Configuration

This page allows you to determine the type of traffic through the controller that is logged for display in Syslog, E-mailed logs, or the Event Viewer. Denial of service attacks, general attack information, login attempts, dropped packets, and similar events can be captured for review by the IT administrator. Traffic through each network segment (LAN, Option, DMZ) can be tracked based on whether the packet was accepted or dropped by the firewall.

Accepted Packets are those that were successfully transferred through the corresponding network segment (i.e. LAN to Option). This option is particularly useful when the Default Outbound Policy is "Block Always" so the IT admin can monitor traffic that is passed through the firewall.

• **Example**: If Accept Packets from LAN to Option is enabled and there is a firewall rule to allow SSH traffic from LAN, then whenever a LAN machine tries to make an SSH connection, those packets will be accepted and a message will be logged. (Assuming the log option is set to Allow for the SSH firewall rule.)

Dropped Packets are packets that were intentionally blocked from being transferred through the corresponding network segment. This option is useful when the Default Outbound Policy is "Allow Always".

- **Example**: If Drop Packets from LAN to Option is enabled and there is a firewall rule to block SSH traffic from LAN, then whenever a LAN machine tries to make an SSH connection, those packets will be dropped and a message will be logged. (Make sure the log option is set to allow for this firewall rule.)
- Enabling accepted packet logging through the firewall may generate a significant volume of log messages depending on the typical network traffic. This is recommended for debugging purposes only.

In addition to network segment logging, unicast and multicast traffic can be logged. Unicast packets have a single destination on the network, whereas broadcast (or multicast) packets are sent to all possible destinations simultaneously. One other useful log control is to log packets that are dropped due to configured bandwidth profiles over a particular interface. This data will indicate to the admin whether the bandwidth profile has to be modified to account for the desired internet traffic of LAN users.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin 🕨				
Date and Time	LOGS CONFIGURATIO	N		LOGOUT
Log Settings D	This page allows user to	configure system wide log se	ttings.	
System	Save Settings	Don't Save Setting	s	
Firmware	Pouting Logs			
Firmware via USB	Routing Logs	Accented	Packets I	Dropped Packets
Dynamic DNS	LAN to Option		Fackets	
System Check	Option to LAN			
Schedules	Option to DMZ	:		
License	DMZ to Option	:		
	LAN to DMZ:			
	DMZ to LAN:			
	VLAN to VLAN:			
	System Logs			
	All Unicast Traffic:			
	All Broadcast / Mu	lticast Traffic: 🛛 🔽		
	FTP Logs:	\checkmark		
	Redirected ICMP P	ackets:		
	Invalid Packets:			
	Other Events Logs			
	Bandwidth Limit:			

Figure 170: Log configuration options for traffic through controller

12.6.2 Sending Logs to E-mail or Syslog

Tools > Log Settings > Remote Logging

Once you have configured the type of logs that you want the controller to collect, they can be sent to either a Syslog server or an E-Mail address. For remote logging a key configuration field is the Remote Log Identifier. Every logged message will contain the configured prefix of the Remote Log Identifier, so that syslog servers or email addresses that receive logs from more than one controller can sort for the relevant device's logs. Once you enable the option to e-mail logs, enter the e-mail server's address (IP address or FQDN) of the SMTP server. The controller will connect to this server when sending e-mails out to the configured addresses. The SMTP port and return e-mail addresses are required fields to allow the controller to package the logs and send a valid e-mail that is accepted by one of the configured "send-to" addresses. Up to three e-mail addresses can be configured as log recipients.

In order to establish a connection with the configured SMTP port and server, define the server's authentication requirements. The controller supports Login Plain (no encryption) or CRAM-MD5 (encrypted) for the username and password data to be sent to the SMTP server. Authentication can be disabled if the server does not have this requirement. In some cases the SMTP server may send out IDENT requests, and this controller can have this response option enabled as needed.

Once the e-mail server and recipient details are defined you can determine when the controller should send out logs. E-mail logs can be sent out based on a defined schedule by first choosing the unit (i.e. the frequency) of sending logs: Hourly, Daily, or Weekly. Selecting Never will disable log e-mails but will preserve the e-mail server settings.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin 🕨				
Date and Time	REMOTE LOGGING C	ONFIGURATION		LOGOUT
Log Settings 🛛 🖒	This page allows user to	o configure the remote logg	ing options for the router.	
System	Save Settings	Don't Save Setting	gs	
Firmware	Log Options			
Firmware via USB	Remote Log Identi	ifier: D\	WC-1000	
Dynamic DNS	Enable E-Mail Loos			
System Check	Enable E-Mail Logs			
Schedules	E-Mail Server Add	POCC		
Liœnse	E MTD Doct			
	SMTP Port:	23		
	Return E-Mail Add	ress:		
	Send to E-Mail Add	iress(1):		
	Send to E-Mail Add	dress(2):		(Optional)
	Send to E-Mail Add	dress(3):		(Optional)
	Authentication wit	h SMTP Server: No	one 🚽	
	User Name:	ad	nin	
	Password:	••		
	Respond to Identd Server:	from SMTP		
	Send E-mail logs by S	Schedule		
	Unit:	N	ever 🚽	
	Day:	Su	inday 🔔	
	Time:	1:	00 🖵 🎯 (AM) 🔘	(PM)

Figure 171: E-mail configuration as a Remote Logging option

An external Syslog server is often used by network administrator to collect and store logs from the controller. This remote device typically has less memory constraints than the local Event Viewer on the controller GUI, and thus can collect a considerable number of logs over a sustained period. This is typically very useful for debugging network issues or to monitor controller traffic over a long duration.

This controller supports up to 8 concurrent Syslog servers. Each can be configured to receive different log facility messages of varying severity. To enable a Syslog

server select the checkbox next to an empty Syslog server field and assign the IP address or FQDN to the Name field. The selected facility and severity level messages will be sent to the configured (and enabled) Syslog server once you save this configuration page's settings.



SYS LOG SERVER CONFIGURATION						
		Name	SysLog Fa	cility	SysLog S	everity
	SysLog Server1:		All	~	All	-
	SysLog Server2:		All	~	All	7
	SysLog Server3:		All	~	All	-
	SysLog Server4:		All	~	All	-
	SysLog Server5:		All	~	All	-
	SysLog Server6:		All	-	All	-
	SysLog Server7:		All	~	All	-
	SysLog Server8:		All	7	All	v

12.6.3 Event Log Viewer in GUI

Status > Logs > View All Logs

The controller GUI lets you observe configured log messages from the Status menu. Whenever traffic through or to the controller matches the settings determined in the $Tools > Log \ Settings > Logs \ Facility$ or $Tools > Log \ Settings > Logs$ Configuration pages, the corresponding log message will be displayed in this window with a timestamp.

It is very important to have accurate system time (manually set or from a NTP server) in order to understand log messages.

Status > Logs > VPN Logs

The following feature is available upon licensed activation of VPN / Firewall features for the system.

This page displays IPsec VPN log messages as determined by the configuration settings for facility and severity. This data is useful when evaluating IPsec VPN traffic and tunnel health.

DWC-1000 SETUP ADVANCED TOOLS STATUS Dashboard Þ VPN LOGS LOGOUT Global Info Þ Device Info Þ This page shows the VPN (IPSEC) related log. Access Point Info ₽ **Display Logs** LAN Clients Info Þ Fri Oct 07 03:39:23 2011 (GMT +0000): [DWC-1000] [IKE] INFO: IKE started Wireless Client Info 🕩 Logs D Traffic Monitor Þ Active Sessions Active VPNs Refresh Logs Clear Logs

Figure 173: VPN logs displayed in GUI event viewer

Status > Logs > SSLVPN Logs

The following feature is available upon licensed activation of VPN / Firewall features for the system.

This page displays SSLVPN log messages as determined by the configuration settings for facility and severity. This data is useful when evaluating SSL VPN traffic and tunnel health.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Dashboard 🕨 🕨				
Global Info 🔶	VIEW SSLVPN LOGS			LOGOUT
Device Info	This page shows the VPN	(SSLVPN) related log.		
Access Point Info	Display Logs			
LAN Clients Info				
Wireless Client Info 🔸				
VLAN Info				
Logs D				
Traffic Monitor				
Active Sessions				
Active VPNs				
				÷.
		Refresh Logs	Clear Logs	

Figure 174: SSL VPN logs displayed in GUI event viewer

12.7 Backing up and Restoring Configuration Settings

Tools > System

You can back up the controller custom configuration settings to restore them to a different device or the same controller after some other changes. During backup, your settings are saved as a file on your host. You can restore the controller saved settings from this file as well. This page will also allow you revert to factory default settings or execute a soft reboot of the controller.

IMPORTANT! During a restore operation, do NOT try to go online, turn off the controller, shut down the PC, or do anything else to the controller until the operation is complete. This will take approximately 1 minute. Once the LEDs are turned off, wait a few more seconds before doing anything with the controller.

For backing up configuration or restoring a previously saved configuration, please follow the steps below:

- To save a copy of your current settings, click the Backup button in the Save Current Settings option. The browser initiates an export of the configuration file and prompts to save the file on your host.
- 2. To restore your saved settings from a backup file, click Browse then locate the file on the host. After clicking Restore, the controller begins importing the file's saved configuration settings. After the restore, the controller reboots automatically with the restored settings.
- 3. To erase your current settings and revert to factory default settings, click the Default button. The controller will then restore configuration settings to factory defaults and will reboot automatically. (See Appendix B for the factory default parameters for the controller).

Figure 175: Restoring configuration from a saved file will result in the current configuration being overwritten and a reboot

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin 🕨				
Date and Time				
Log Settings 🔹 🕨	SYSTEM			LOGOUT
System	This page allows user to d default. This page also allo	o configuration related opera ows user to reboot the router	tions which includes backup, i	restore and factory
Firmware				
Firmware via USB	Backup / Restore Set	ttings 		
Dynamic DNS	Save Current Setti	ngs: B	ackup	
System Check	Restore Saved Set	tings:		Browse
Schedules		R	estore	
License	Factory Default set	tings: D	efault	
	Reboot:	R	eboot	
				,

12.8 Upgrading Wirelesss Controller Firmware

Tools > Firmware

You can upgrade to a newer software version from the Administration web page. In the Firmware Upgrade section, to upgrade your firmware, click Browse, locate and select the firmware image on your host, and click Upgrade. After the new firmware image is validated, the new image is written to flash, and the controller is automatically rebooted with the new firmware. The Firmware Information and also the *Status* > *Device Info* > *Device Status* page will reflect the new firmware version.

IMPORTANT! During firmware upgrade, do NOT try to go online, turn off the DWC-1000, shut down the PC, or interrupt the process in anyway until the operation is complete. This should take only a minute or so including the reboot process. Interrupting the upgrade process at specific points when the flash is being written to may corrupt the flash memory and render the controller unusable without a low-level process of restoring the flash firmware (not through the web GUI).

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS	
Admin 🕨					
Date and Time					
Log Settings 🛛 🕨	FIRMWARE			LOGOUT	
System	This page allows user to u	upgrade/downgrade the route	r firmware. This page also sh	nows the information	
Firmware	regarding firmware versio	on and build time.			
Firmware via USB	Firmware Information				
Dynamic DNS	Firmware Version:	Firmware Version: 1.01B61_WW			
System Check	WLAN Module Versio	WLAN Module Version: 4.0.0.1			
Schedules	Firmware Date: Fri Nov 18 19:17:17 2011				
License	Firmware Upgrade				
	Locate & select the	upgrade file:		Browse	
			rade	browse	
		opg	lade		
	Firmware Upgrade Not	ification Options			
	Check Now:	CI	neck Now		
	Status:				

Figure 176: Firmware version information and upgrade option

This controller also supports an automated notification to determine if a newer firmware version is available for this controller. By clicking the Check Now button in the notification section, the controller will check a D-Link server to see if a newer firmware version for this controller is available for download and update the Status field below.

12.9 Dynamic DNS Setup

Tools > Dynamic DNS

Dynamic DNS (DDNS) is an Internet service that allows controller with varying public IP addresses to be located using Internet domain names. To use DDNS, you must setup an account with a DDNS provider such as DynDNS.org, D-Link DDNS, or Oray.net.

Each configured Option can have a different DDNS service if required. Once configured, the controller will update DDNS services changes in the Option IP address so that features that are dependent on accessing the controller Option via FQDN will be directed to the correct IP address. When you set up an account with a DDNS service, the host and domain name, username, password and wildcard support will be provided by the account provider.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin 🕨				
Date and Time	DYNAMIC DNS			LOGOUT
Log Settings 🔹 🕨	Dynamic DNS (DDNS) is an	Internet service that allows r	outers with varying public IP	addresses to be located
System	DynDNS.com, DlinkDDNS.com	com or Oray.net.	etup an account with a DDNS	provider such as
Firmware	Save Settings	Don't Save Settings	3	
Firmware via USB				
Dynamic DNS	Option Mode			
System Check	Option WAN Mode:	Use	only single Option port Op	ption1
Schedules	Option1 (DDNS Statu	ıs:)		
License	Select the Dynamic	DNS Service: Nor	ie 👻	
	Host and Domain N	lame:		
	User Name:			
	Password:			
	Use wildcards:			
	Update every 30 da	ays:		
	Option2			
	Select the Dynamic	DNS Service: Nor	ne 🔻	
	Host and Domain N	lame:		
	User Name:			

Figure 177: Dynamic DNS configuration

12.9.1 Using Diagnostic Tools

Tools > System Check

The controller has built in tools to allow an administrator to evaluate the communication status and overall network health.

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin 🕨				
Date and Time	SYSTEM CHECK			LOGOUT
Log Settings	This page can be used for	diagnostics purpose. This page	ge provides user with some	diagnostic tools like ping,
System	traceroute and packet shi	ner.		
Firmware	Ping or Trace an IP A	ddress		
Firmware via USB	IP Address / Doma	in Name: www	w.dlink.com	
Dynamic DNS			Ping Tracero	oute
System Check	Perform a DNS Looku	ıp		
Schedules	Internet Name:			
License			ookup	
	Router Options			
	Display the IPv4 R	outing Table:	Display	
	Display the IPv6 R	outing Table:	Display	
	Capture Packets:	Pa	cket Trace	

Figure 178: Controller diagnostics tools available in the GUI

12.9.2 Ping

This utility can be used to test connectivity between this controller and another device on the network connected to this controller. Enter an IP address and click PING. The command output will appear indicating the ICMP echo request status.

12.9.3 Trace Route

This utility will display all the controller present between the destination IP address and this controller. Up to 30 "hops" (intermediate controller) between this controller and the destination will be displayed.

12.9.4 DNS Lookup

To retrieve the IP address of a Web, FTP, Mail or any other server on the Internet, type the Internet Name in the text box and click Lookup. If the host or domain entry exists, you will see a response with the IP address. A message stating "Unknown Host" indicates that the specified Internet Name does not exist.

This feature assumes there is internet access available on the Option link(s).

12.9.5 Router Options

The static and dynamic routes configured on this controller can be shown by clicking Display for the corresponding routing table. Clicking the Packet Trace button will allow the controller to capture and display traffic through the DW C-1000 between the LAN and Option interface as well. This information is often very useful in debugging traffic and routing issues.

Chapter 13. License Activation

Tools > License

You can activate AP6 and VPN licenses in this controller by providing valid Activation Key and click Activate key. After activating license AP6 license you should be able to manage 6 more AP's. VPN license activates the VPN license functionality on the DWC-1000 device.

The AP firmware version must as same as DWC-1000 WLAN module version

Figure 179: Installing a License

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin 🕨				
Date and Time	LICENSES			LOGOUT
Log Settings 🛛 🕨				
System	This page shows the list of activated licenses and also can be used for activating new DWC-1000-VPN and DWC-1000-AP6 licenses.			
Firmware				
Firmware via USB	List of Available Licens	es		
Dynamic DNS	# Licence M	lodel	Activation Code	Expires
System Check	License Activation			
Schedules	Activation Code:			
License			Activate	

Figure 180: Available Licenses Display after installing a License

DWC-1000	SETUP	ADVANCED	TOOLS	STATUS
Admin 🕨	License Activation Succeded. Please reboot the device			
Date and Time				LOGOUT
Log Settings				
System				
Firmware	List of Available Licens	ses		
Firmware via USB	# Licence Model	A	Activation Code	Expires
System Check	0 DWC-1000-AP6	8E0BA0E	30EA5827FB159911000	Perpetual
License	License Activation			
	Activation Code:			
			Activate	

The new features will be enabled after system reboot.

Appendix A. Glossary

ARP	Address Resolution Protocol. Broadcast protocol for mapping IP addresses to MAC addresses.
СНАР	Challenge-Handshake Authentication Protocol. Protocol for authenticating users to an ISP.
DDNS	Dynamic DNS. System for updating domain names in real time. Allow s a domain name to be assigned to a device with a dynamic IP address.
DHCP	Dynamic Host Configuration Protocol. Protocol for allocating IP addresses dynamically so that addresses can be reused when hosts no longer need them.
DNS	Domain Name System. Mechanism for translating H.323 IDs, URLs, or e-mail IDs into IP addresses. Also used to assist in locating remote gatekeepers and to map IP addresses to hostnames of administrative domains.
FQDN	Fully qualified domain name. Complete domain name, including the host portion. Example: serverA.companyA.com.
FTP	File Transfer Protocol. Protocol for transferring files between network nodes.
НТТР	Hypertext Transfer Protocol. Protocol used by web browsers and web servers to transfer files.
IKE	Internet Key Exchange. Mode for securely exchanging encryption keys in ISAKMP as part of building a VPN tunnel.
IPsec	IP security. Suite of protocols for securing VPN tunnels by authenticating or encrypting IP packets in a data stream. IPsec operates in either transport mode (encrypts payload but not packet headers) or tunnel mode (encrypts both payload and packet headers).

ISAKMP	Internet Key Exchange Security Protocol. Protocol for establishing security associations and cryptographic keys on the Internet.
ISP	Internet service provider.
MAC Address	Media-access-control address. Unique physical-address identifier attached to a netw ork adapter.
MTU	Maximum transmission unit. Size, in bytes, of the largest packet that can be passed on. The MTU for Ethernet is a 1500-byte packet.
NAT	Netw ork Address Translation. Process of rewriting IP addresses as a packet passes through a controller or firew all. NAT enables multiple hosts on a LAN to access the Internet using the single public IP address of the LAN's gatew ay controller.
NetBIOS	Microsoft Window s protocol for file sharing, printer sharing, messaging, authentication, and name resolution.
NTP	Netw ork Time Protocol. Protocol for synchronizing a controller to a single clock on the netw ork, know n as the clock master.
ΡΑΡ	Passw ord Authentication Protocol. Protocol for authenticating users to a remote access server or ISP.
PPPoE	Point-to-Point Protocol over Ethernet. Protocol for connecting a network of hosts to an ISP without the ISP having to manage the allocation of IP addresses.
РРТР	Point-to-Point Tunneling Protocol. Protocol for creation of VPNs for the secure transfer of data from remote clients to private servers over the Internet.

RADIUS	Remote Authentication Dial-In User Service. Protocol for remote user authentication and accounting. Provides centralized management of usernames and passw ords.
RSA	Rivest-Shamir-Adleman. Public key encryption algorithm.
ТСР	Transmission Control Protocol. Protocol for transmitting data over the Internet with guaranteed reliability and in-order delivery.
UDP	User Data Protocol. Protocol for transmitting data over the Internet quickly but with no guarantee of reliability or in-order delivery.
VPN	Virtual private netw ork. Netw ork that enables IP traffic to travel securely over a public TCP/IP netw ork by encrypting all traffic from one netw ork to another. Uses tunneling to encrypt all information at the IP level.
WINS	Window s Internet Name Service. Service for name resolution. Allow s clients on different IP subnets to dynamically resolve addresses, register themselves, and browse the network without sending broadcasts.

Appendix B. Factory Default Settings

Feature	Description	Default Setting
	User login URL	http://192.168.10.1
Device login	User name (case sensitive)	admin
	Login password (case sensitive)	admin
	Option MAC address	Use default address
Internet Connection	Option MTU size	1500
	Port speed	Autosense
	IP address	192.168.10.1
	IPv4 subnet mask	255.255.255.0
Local area network (LAN)	RIP direction	None
	RIP version	Disabled
	RIP authentication	Disabled
	DHCP server	Enabled

	DHCP starting IP address	192.168.10.2
	DHCP ending IP address	192.168.10.100
	Time zone	GMT
	Time zone adjusted for Daylight Saving Time	Disabled
	SNMP	Disabled
	Remote management	Disabled
	Inbound communications from the Internet	Disabled (except traffic on port 80, the HTTP port)
Firewall	Outbound communications to the Internet	Enabled (all)
	Source MAC filtering	Disabled
	Stealth mode	Enabled