



Tech Pack: LACP

Webinar

Moderator: Alexander Koller

05.10.2023



D-LINK (Deutschland) GmbH

Schwalbacher Straße 74

65760 Eschborn

www.dlink.com

Alexander Koller

Network Specialist

alexander.koller@dlink.com

Themen

- Was ist LACP?
- Konfiguration an D-Link Switchen
- LACP & VLAN
- LACP HASH Algorithmen (Übersicht)

Über uns



Globale Präsenz

Über **127** lokale Vertriebsniederlassungen in mehr als **56** Ländern. **20** regionale Warenlager in **15** Ländern und über **50** RMA Reparatur Zentren weltweit



Schwerpunkte

Entwicklung, Produktion und weltweiter Vertrieb

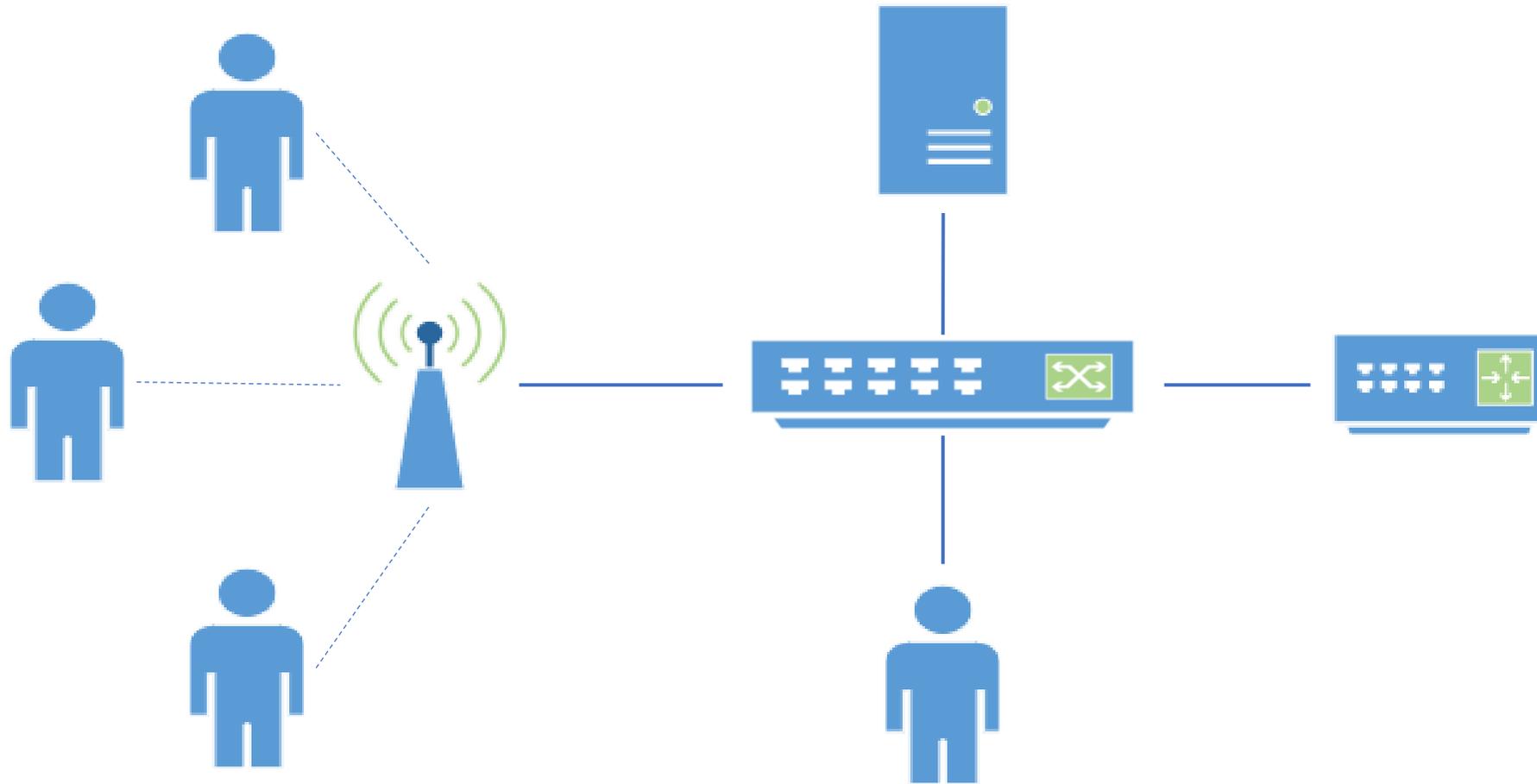


Zielgruppen

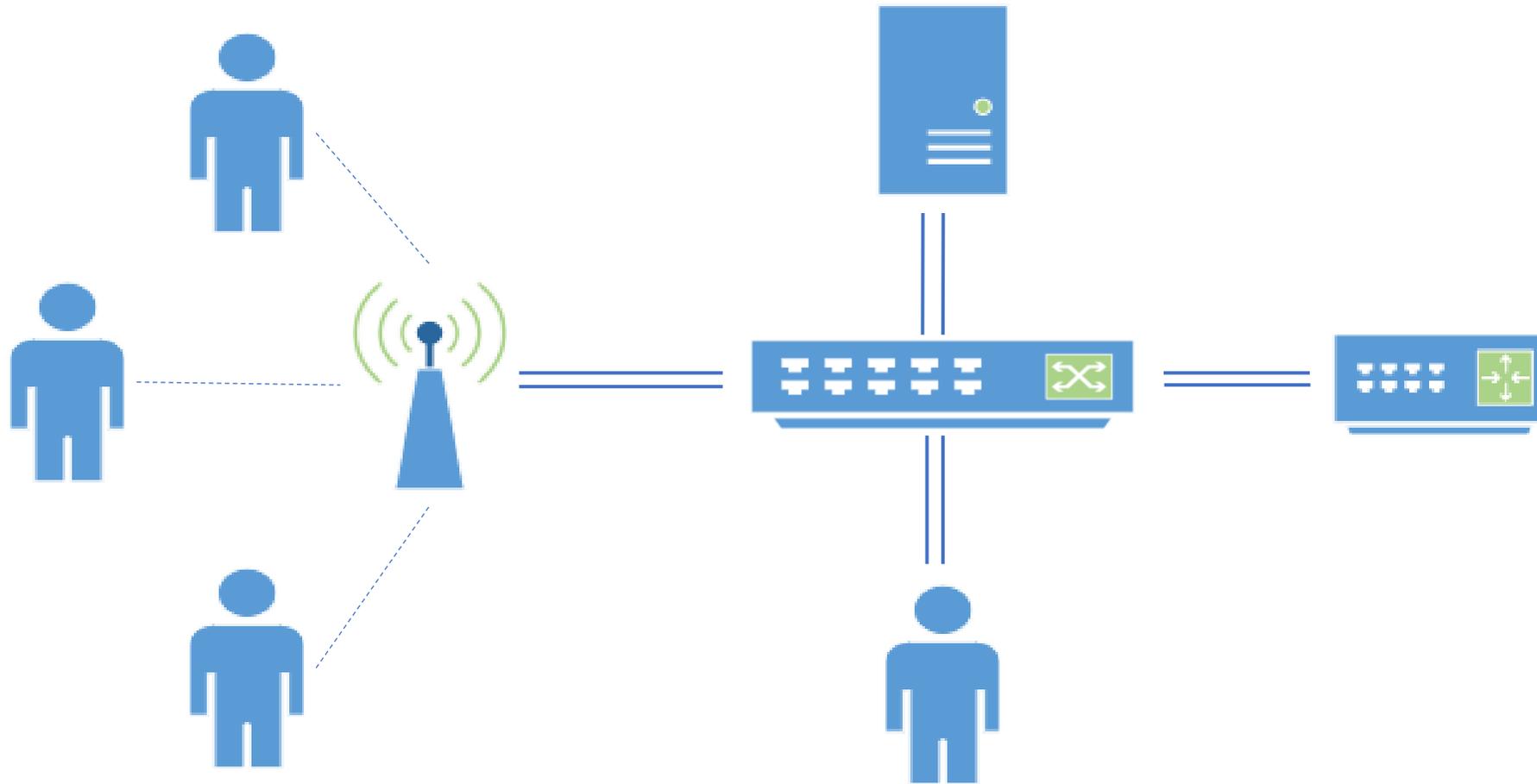
Unternehmen, Verbraucher, Telekommunikations- & Service-Provider. Öffentliche Einrichtungen wie z.B. Schulen & Behörden



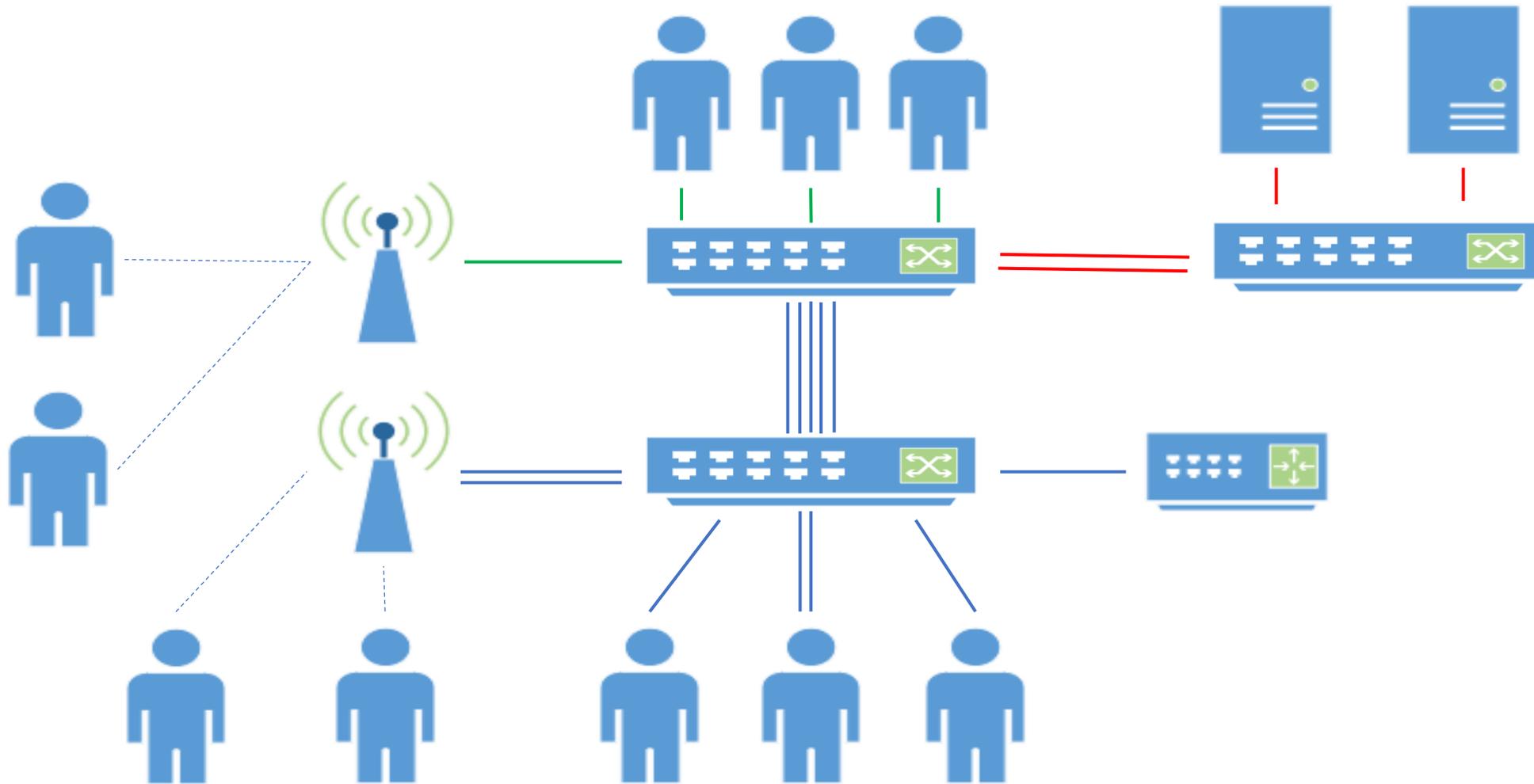
Was ist LACP? – ein normales Netzwerk (früher)



Was ist LACP? – mögliche LAGs



Was ist LACP? – Netzwerkwachstum (heute)



■ Was ist LACP? – die Definition

- Link Aggregation
- Bündelung mehrere physischer LAN-Schnittstellen zu einem logischen Kanal
 - Erhöhung des Datendurchsatzes
 - Ausfallsicherheit
 - Wichtig! Es führt nicht zu einer Erhöhung der Geschwindigkeit der einzelnen Verbindung
- Fast jeder Netzwerkhersteller hat ein eigenes Verfahren für Link Aggregation, welche untereinander inkompatibel sind (meistens als statischer Trunk bezeichnet)
- LACP (Link Aggregation Control Protocol)
 - Herstellerunabhängiger Standard für Link Aggregation (IEEE 802.1AX-2008 vormals IEEE 802.3ad)

Was ist LACP? – die Funktionsweise

- Bis zu acht Ports können zu einer Link Aggregation Group (LAG) verbunden
- Ein LAG wird wie ein einzelner Port behandelt (kein Loop)
- Erkennung und Kontrolle erfolgt über LACP BPDU (Bridge Protocol Data Unit)
- LACP Modus:
 - Aktiv (Active LACP)
 - Sekündliches Senden des Kontroll-Paketes
 - Passiv (Passive LACP)
 - Nur antworten auf ein empfangenes Kontroll-Paket
 - Aktiv-Aktiv, Aktiv-Passiv (weniger Pakete)
- Load Balancing Algorithmen zum Verteilen der Pakete auf die verfügbaren Leitungen

Die Konfiguration eines DGS-1210 Rev F/G

D-Link
Building Networks for People

admin - 192.168.10.10

Save Tools Wizard Help Surveillance Mode Logout

DGS-1210-10

- System
- VLAN
- L2 Functions**
 - Jumbo Frame
 - Port Mirroring
 - Loopback Detection
 - MAC Address Table
 - Spanning Tree
 - Link Aggregation**
 - Port Trunking**
 - LACP Port Settings
 - Multicast
 - SSTP
 - LLDP
- L3 Functions
- QoS
- Security
- AAA
- ACL
- SNMP
- Monitoring

Port Trunking

Link Aggregation Enabled Disabled Apply

Link Aggregation Settings

Group 01 Type LACP Apply

Port	01	02	03	04	05
	<input type="checkbox"/>				
Port	06	07	08	09	10
	<input type="checkbox"/>				

Maximum 8 ports in static group and 8 ports in LACP group.

Trunking list

Group	Type	Ports	Delete
-------	------	-------	--------

Die Konfiguration eines DGS-1210 Rev F/G

D-Link Building Networks for People

Smart

admin - 192.168.10.1

Save Tools Wizard Help Surveillance Mode Logout

DGS-1210-10

- System
- VLAN
 - 802.1Q VLAN
 - 802.1Q VLAN PVID
 - Voice VLAN
 - Auto Surveillance VLAN
- L2 Functions
 - Jumbo Frame
 - Port Mirroring
 - Loopback Detection
 - MAC Address Table
 - Spanning Tree
 - Link Aggregation
 - Port Trunking**
 - LACP Port Settings
- L3 Functions
- QoS
- Security
- AAA
- ACL
- SNMP
- Monitoring

Port Trunking

Link Aggregation Enabled Disabled Apply

Link Aggregation Settings

Group Type Apply

Port	01	02	03	04	05
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Port	06	07	08	09	10
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Maximum 8 ports in static group and 8 ports in LACP group.

Trunking list

Group	Type	Ports	Delete
01	LACP	05, 06, 07, 08	Delete

Die Konfiguration eines DGS-1210 Rev F/G

The screenshot displays the D-Link web management interface for a DGS-1210-10 switch. The top navigation bar includes the D-Link logo, the slogan "Building Networks for People", and the "Smart" logo. The user is logged in as "admin - 192.168.10.". The main menu on the left lists various configuration categories: System, VLAN, Voice VLAN, Auto Surveillance VLAN, L2 Functions, Multicast, SNTP, LLDP, L3 Functions, QoS, Security, AAA, ACL, SNMP, and Monitoring. The "L2 Functions" category is expanded, and "LACP Port Settings" is selected. The main content area shows the "LACP Port Settings" configuration page. At the top right of this page is a "Safeguard" indicator. Below the title, there are four configuration fields: "From Port" (set to 01), "To Port" (set to 10), "Activity" (set to Passive), and "Timeout" (set to Short (3 sec)). An "Apply" button is located to the right of these fields. Below the configuration fields is a table showing the LACP settings for each port:

Port	Activity	Timeout
01	Active	Long (90 sec)
02	Active	Long (90 sec)
03	Active	Long (90 sec)
04	Active	Long (90 sec)
05	Active	Long (90 sec)
06	Active	Long (90 sec)
07	Active	Long (90 sec)
08	Active	Long (90 sec)
09	Active	Long (90 sec)
10	Active	Long (90 sec)

Die Konfiguration des DGS-1100-V2

D-Link
Building Networks for People

Save Tools Wizard Online Help

Logged in as: admin- 192.168.10.16 Logout

Fuzzy Search

- DGS-1100-10MPV2
 - System
 - Management
 - L2 Features**
 - FDB
 - VLAN
 - Spanning Tree
 - Loopback Detection
 - Link Aggregation**
 - L2 Multicast Control
 - LLDP
 - QoS
 - Security
 - OAM
 - Monitoring
 - Green

Link Aggregation

Channel Group Information

From Port: eth5 To Port: eth8 Group ID (1-8): 1 Mode: On

Add Delete Member Port

Note: Each Channel Group supports up to 8 member ports. Up to 8 Channel Groups.

Total Entries: 0

Channel Group	Protocol	Max Ports	Member Number	Member Ports
---------------	----------	-----------	---------------	--------------

Die Konfiguration des DGS-1100-V2

The screenshot shows the D-Link web management interface for a DGS-1100-10MPV2 switch. The top navigation bar includes 'Save', 'Tools', 'Wizard', and 'Online Help'. The user is logged in as 'admin-192.168.10.16'. The left sidebar shows a tree view of configuration categories, with 'Link Aggregation' selected under 'L2 Features'. The main content area is titled 'Link Aggregation' and contains the following configuration options:

Channel Group Information

From Port: eth1 | To Port: eth1 | Group ID (1-8): | Mode: On

Note: Each Channel Group supports up to 8 member ports. Up to 8 Channel Groups.

Total Entries: 1

Channel Group	Protocol	Max Ports	Member Number	Member Ports	
port channel 1	Static	8	4	eth5,eth6,eth7,eth8	Delete Channel

Die Konfiguration des DGS-1520

D-Link Building Networks for People

DGS-1520-28MP

Link # / Act: 1G 10/100M 2.5G 100M/1G PoE OK PoE Fail

Refresh Interval: 10 secs

Save Tools Wizard Online Help English

Logged in as: Administrator, ... Logout

Fuzzy Search

- DGS-1520-28MP
 - System
 - Management
 - L2 Features**
 - FDB
 - VLAN
 - VLAN Tunnel
 - STP
 - ERPS (G.8032)
 - Loopback Detection
 - Link Aggregation**
 - L2 Protocol Tunnel
 - L2 Multicast Control
 - LLDP
 - L3 Features
 - QoS
 - ACL
 - Security

Link Aggregation

System Priority (1-65535):

Load Balance Algorithm:

System ID:

Channel Group Information

From Port: To Port: Mode:

Note: Each Channel Group supports up to 24 member ports.

Total Entries: 0

Channel Group	Protocol	Max Ports	Member Number	Member Ports
---------------	----------	-----------	---------------	--------------

Die Konfiguration des DGS-1520

The screenshot displays the web management interface for a D-Link DGS-1520-28MP switch. The top navigation bar includes the D-Link logo, status indicators for various ports (1G, 10/100M, 2.5G, 100M/1G), and a refresh interval set to 10 seconds. The left sidebar shows a tree view of configuration categories, with 'L2 Features' and 'Link Aggregation' highlighted in red. The main content area is titled 'Link Aggregation' and contains the following configuration fields:

- System Priority (1-65535): 32768
- Load Balance Algorithm: Source Destination MAC
- System ID: 32768,C4-E9-0A-0B-46-00

Below these fields is the 'Channel Group Information' section, which includes a table for defining channel groups:

From Port	To Port	Group ID (1-32)	Mode	
eth1/0/5	eth1/0/8	1	Active	Add

A red box highlights the 'Mode' dropdown menu, which is currently set to 'Active'. The dropdown options are: Active, Static, Active, and Passive. A note below the table states: "Note: Each Channel Group supports up to 8 member ports." At the bottom, there is a table with the following columns: Channel Group, Protocol, Max Ports, Member Number, and Member Ports. The 'Total Entries' is currently 0.

Die Konfiguration des DGS-1520

The screenshot displays the D-Link web management interface for a DGS-1520-28MP switch. The top navigation bar includes the D-Link logo, status indicators for various ports (1G, 10/100M, 2.5G, 100M/1G), PoE status, and a refresh interval set to 10 seconds. The left sidebar shows a navigation tree with 'Link Aggregation' selected under 'L2 Features'. The main content area is titled 'Link Aggregation' and contains the following configuration fields:

- System Priority (1-65535): 32768
- Load Balance Algorithm: Source Destination MAC
- System ID: 32768,C4-E9-0A-0B-46-00

Below these fields is the 'Channel Group Information' section with the following configuration:

- From Port: eth1/0/1
- To Port: eth1/0/1
- Group ID (1-32): (empty)
- Mode: Static

Buttons for 'Add' and 'Delete Member Port' are present. A note states: 'Note: Each Channel Group supports up to 8 member ports.'

The 'Total Entries: 1' section contains a table with the following data:

Channel Group	Protocol	Max Ports	Member Number	Member Ports	
Port-channel1	LACP	8	4	eth1/0/5-1/0/8	Delete Channel Show Detail

Die Konfiguration des VLAN – DGS-1210

Auf 192.168.10.156 wird Folgendes angezeigt:
Members in a VLAN have to be in the same trunk.

Ok

VID Settings

VID: 10
VLAN Name: Test
Maximum 20 characters.

Back Apply

Port	Select All	01	02	03	04	05	06	07	08	09	10
Untagged	All	<input type="radio"/>									
Tagged	All	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
Not member	All	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>					

Die Konfiguration des VLAN - DGS-1100-V2/DGS-1520

D-Link
Building Networks for People

Save Tools Wizard Online Help Logged in as: admin- 192.168.10.16 Logout

Fuzzy Search

- DGS-1100-10MPV2
 - System
 - Management
 - L2 Features
 - FDB
 - VLAN
 - VLAN Configuration Wizard
 - 802.1Q VLAN
 - VLAN Interface**
 - Port-based VLAN
 - Management VLAN
 - Asymmetric VLAN
 - Auto Surveillance VLAN
 - Voice VLAN
 - Spanning Tree
 - Loopback Detection
 - Link Aggregation
 - L2 Multicast Control
 - LLDP

VLAN Interface

VLAN Interface Settings | Port Summary

Port	VLAN Mode	Ingress Checking	Acceptable Frame Type		
eth1	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth2	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth3	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth4	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth5	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth6	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth7	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth8	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth9	Hybrid	Enable	Admit All	VLAN Detail	Edit
eth10	Hybrid	Enable	Admit All	VLAN Detail	Edit
port channel 1	Hybrid	Enable	Admit All	VLAN Detail	Edit

LACP Hash-Algorithmen

- Layer 2
 - MAC basiert
 - SRC, DST, SRC-DST
- Layer 3
 - IP basiert
 - SRC, DST, SRC-DST
- Layer 4
 - Session ID basiert

Fragen?

In eigener Sache und
gut zu wissen

➤ Ihr persönlicher Draht für...

- vertiefende Fragen
- Schulungen vor Ort
- Demogeräte
- kostenfreie Services
- Unterstützung bei Planung & Projekten
- ... und vieles mehr

West



[Michael Bonikowski](#)

Südwest



[Sebastian Boyé](#)

Nordost



[Wolfram Obrikatis](#)

Südost



[Patrick Sychra](#)

Ihr persönlicher Ansprechpartner in der Region begleitet Sie im Projekt – von der Planung bis zur Fertigstellung und darüber hinaus.

Kurzum - für Fragen rund um Ihr Netzwerkgeschäft sind wir für Sie da.

D-Link[®]