



# Tech Pack: LACP

## Webinar

Moderator: Janis Nath  
26.04.2024



# 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



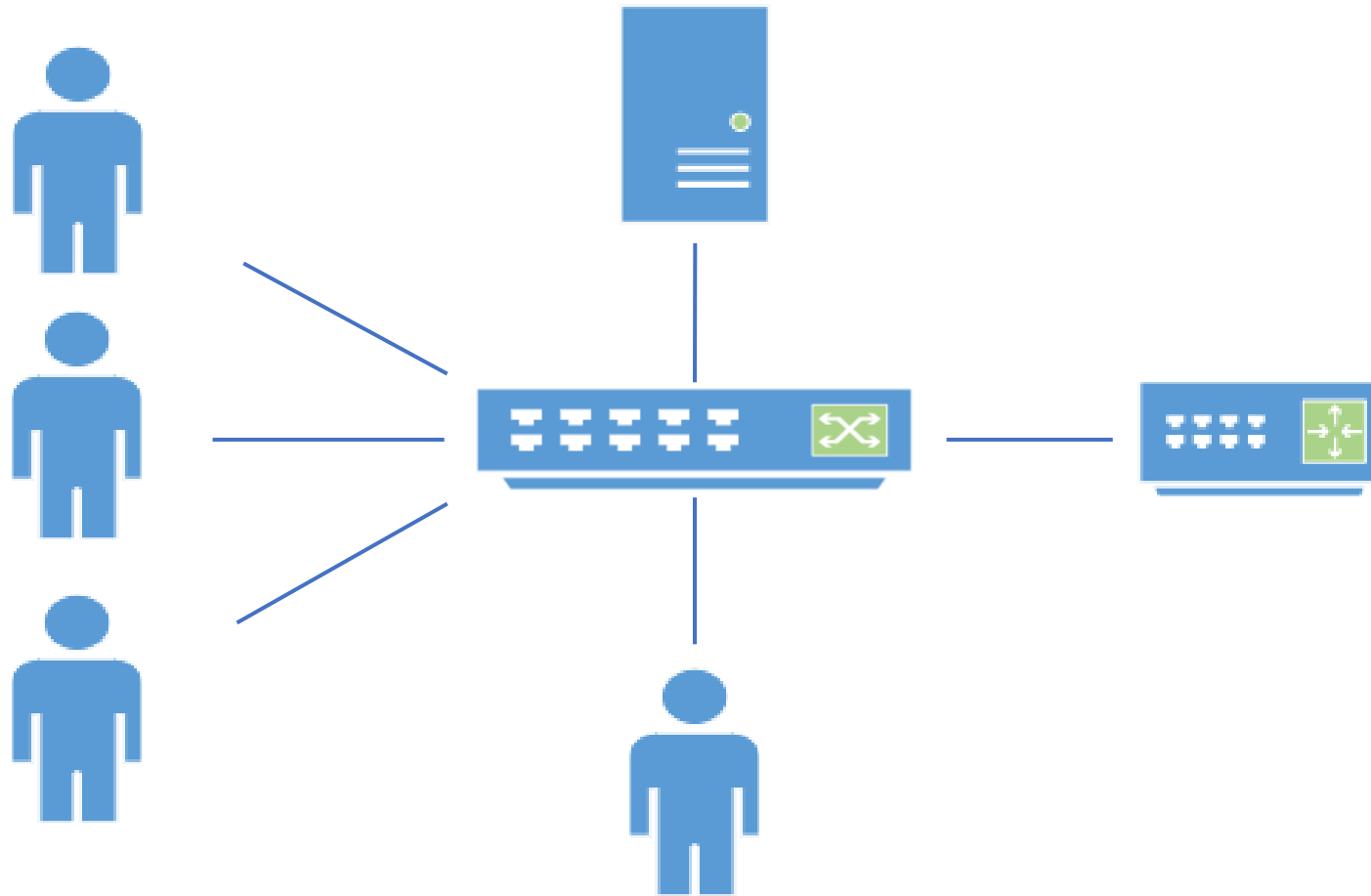
## Zielgruppen

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

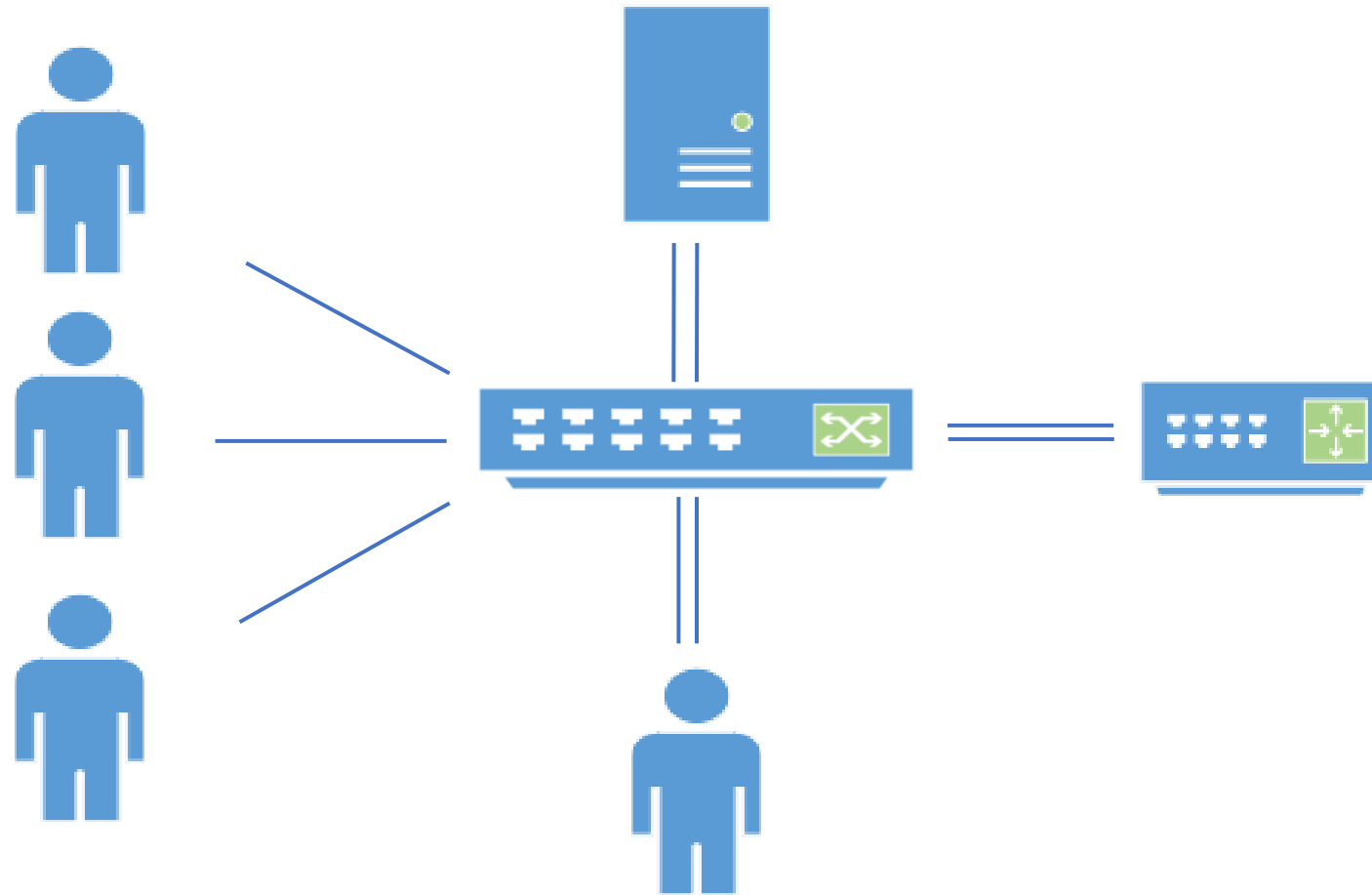


# LACP – Link Aggregation Control Protocol

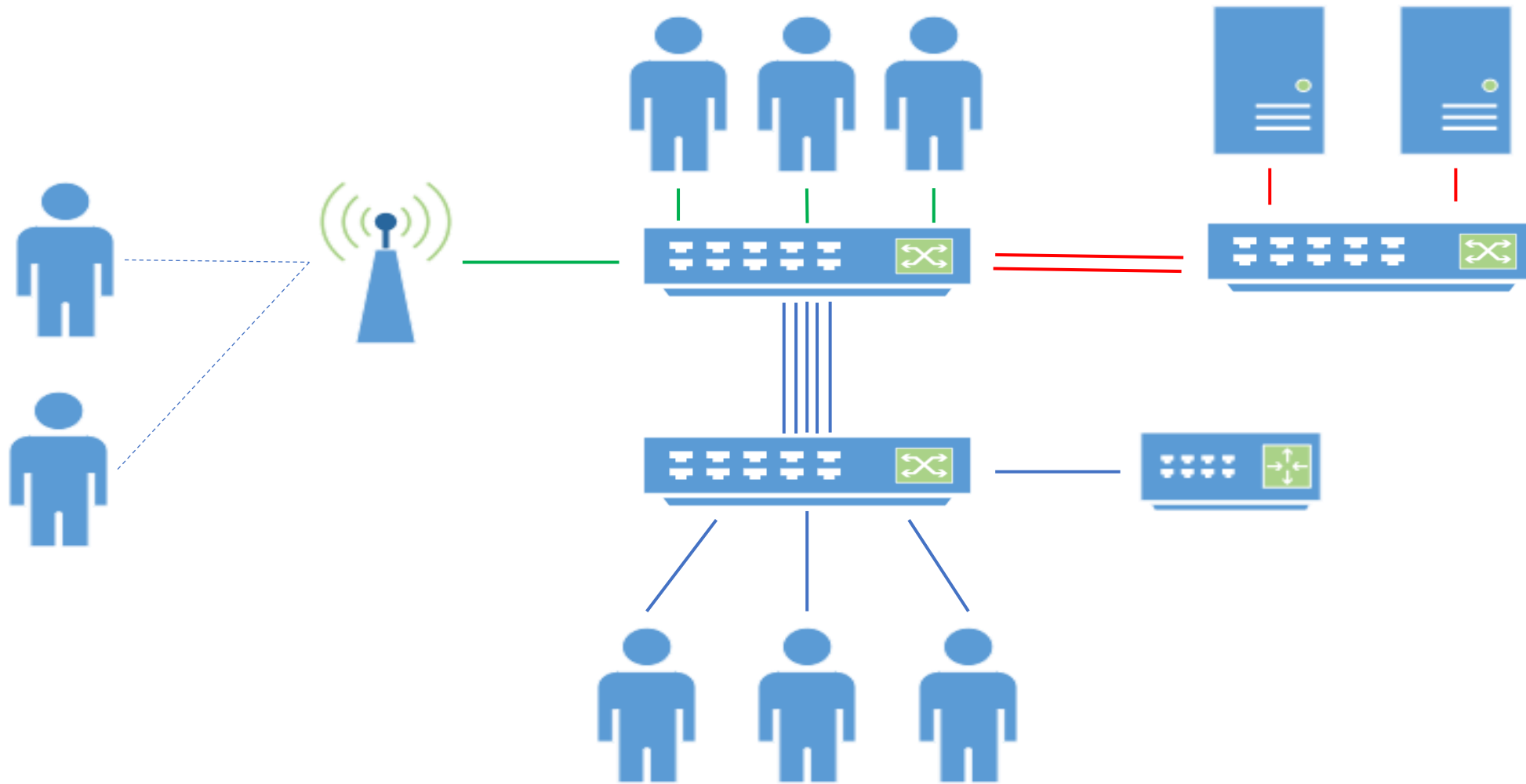
## Was ist LACP? – ein normales Netzwerk (früher)



## 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  Type  Apply

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

# Die Konfiguration eines DGS-1210 Rev F/G

**D-Link**  
Building Networks for People

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	<span>Delete</span>

# Die Konfiguration eines DGS-1210 Rev F/G

The screenshot displays the D-Link web management interface for a DGS-1210-10 switch. The left sidebar shows a tree view of configuration categories, with 'LACP Port Settings' selected under 'L2 Functions'. The main content area is titled 'LACP Port Settings' and includes a 'Safeguard' indicator. At the top, there are navigation buttons: Save, Tools, Wizard, Help, and Surveillance Mode. The user is logged in as 'admin - 192.168.10.'. Below the navigation, there are four dropdown menus: 'From Port' (01), 'To Port' (10), 'Activity' (Passive), and 'Timeout' (Short (3 sec)). An 'Apply' button is located to the right of these settings. Below the dropdowns is a table with three columns: 'Port', 'Activity', and 'Timeout'. The table lists ports 01 through 10, all with 'Active' activity and 'Long (90 sec)' timeout.

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	To Port	Group ID (1-8)	Mode	
<input type="text" value="eth5"/>	<input type="text" value="eth8"/>	<input type="text" value="1"/>	<input type="text" value="On"/>	<input type="button" value="Add"/> <input type="button" value="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

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

Add Delete Member Port

**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

The screenshot displays the D-Link web management interface for a DGS-1520-28MP switch. The top navigation bar includes 'Save', 'Tools', 'Wizard', 'Online Help', and 'English'. The user is logged in as 'Administrator'. 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 (dropdown menu is open)
- System ID: (empty)

The 'Channel Group Information' section shows:

- From Port: eth1/0/1
- To Port: eth1/0/1
- Mode: Static

Buttons for 'Add' and 'Delete Member Port' are visible. A note states: 'Note: Each Channel Group supports up to 8 member ports.' Below this is a table with the following structure:

Channel Group	Protocol	Max Ports	Member Number	Member Ports
Total Entries: 0				

# Die Konfiguration des DGS-1520

The screenshot displays the D-Link web management interface for a DGS-1520-28MP switch. The top status bar shows various indicators for Link, Act, PoE, and Console. The navigation menu on the left highlights 'L2 Features' and 'Link Aggregation'. The main configuration area is titled 'Link Aggregation' and includes the following fields:

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

Channel Group Information:

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

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

Total Entries: 0

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



# 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), and a refresh interval set to 10 seconds. The left sidebar shows a tree view of configuration options, 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, which includes a table for adding member ports:

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

Buttons for 'Add' and 'Delete Member Port' are located to the right of the table. A note states: "Note: Each Channel Group supports up to 8 member ports."

At the bottom, a table shows the current configuration for 'Port-channel1':

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

Buttons for 'Delete Channel' and 'Show Detail' are located to the right of the table.

# 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"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tagged	All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not member	All	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<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?

# Vertriebsregionen und Ansprechpartner



**Michael Bonikowski**

Key Account Manager Business Sales  
PLZ 26, 32-36, 40-49, 50-59, 60-63, 65

Tel.: +49 (0)162 278 6096

Mail: [michael.bonikowski@dlink.com](mailto:michael.bonikowski@dlink.com)



**Sebastian Boyé**

Senior Key Account Manager Business Sales  
PLZ 64, 66-69, 70-79, 88 + Schweiz

Tel.: +49 (0)172 679 3003

Mail: [sebastian.boyé@dlink.com](mailto:sebastian.boyé@dlink.com)



**Wolfram Obrikatis**

Key Account Manager Business Sales  
PLZ 01-19, 20-25, 27-29, 30,31, 37-39, 98-99

Tel.: +49 (0)172 699 7419

Mail: [wolfram.obrikatis@dlink.com](mailto:wolfram.obrikatis@dlink.com)

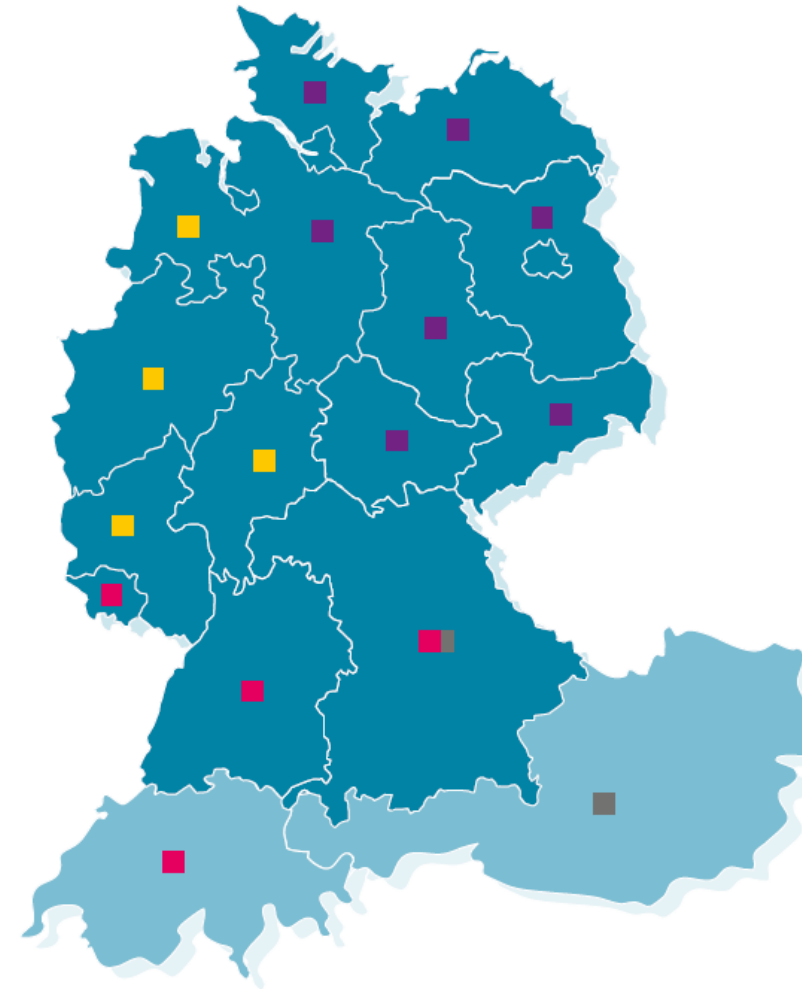


**Oliver Burger**

Account Manager Business Sales  
80-87, 89, 90-97 + Österreich

Tel.: +49 (0)172 699 7389

Mail: [oliver.burger@dlink.com](mailto:oliver.burger@dlink.com)



Besuchen Sie uns auch hier:



**D-Link<sup>®</sup>**