



# Tech Pack: LACP

## Webinar

Moderator: Janis Nath

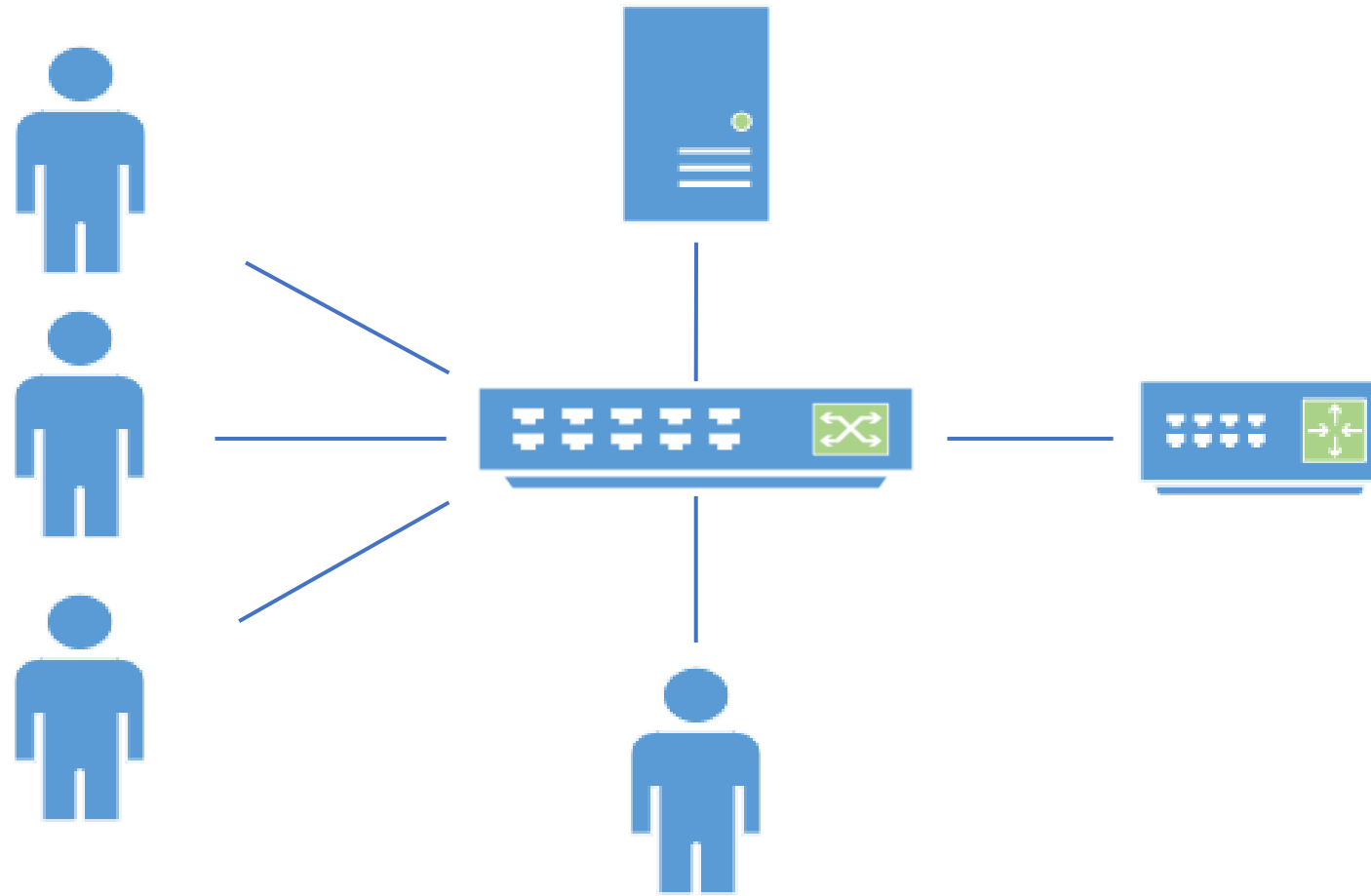
27.06.2025



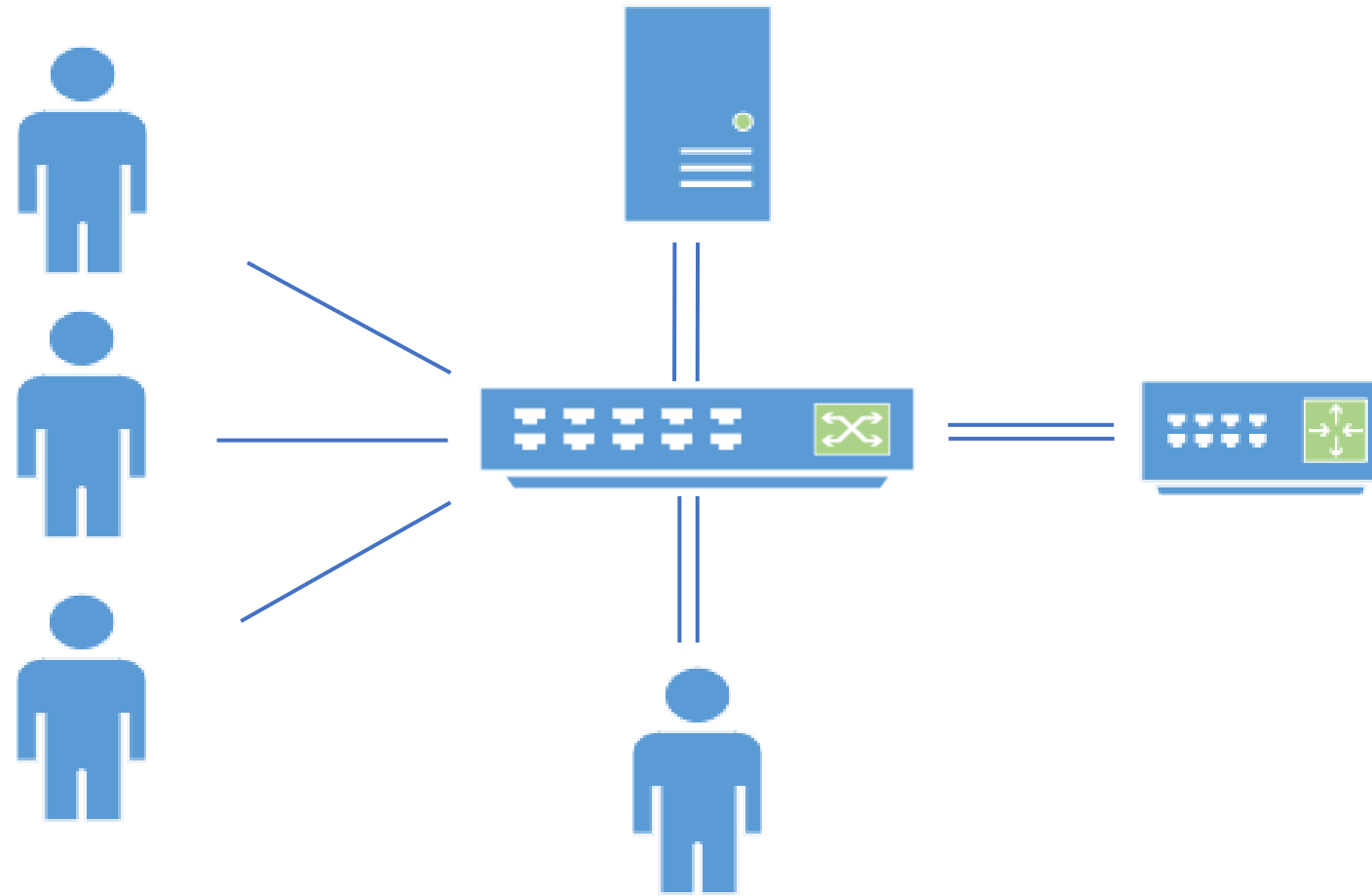
# Themen

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

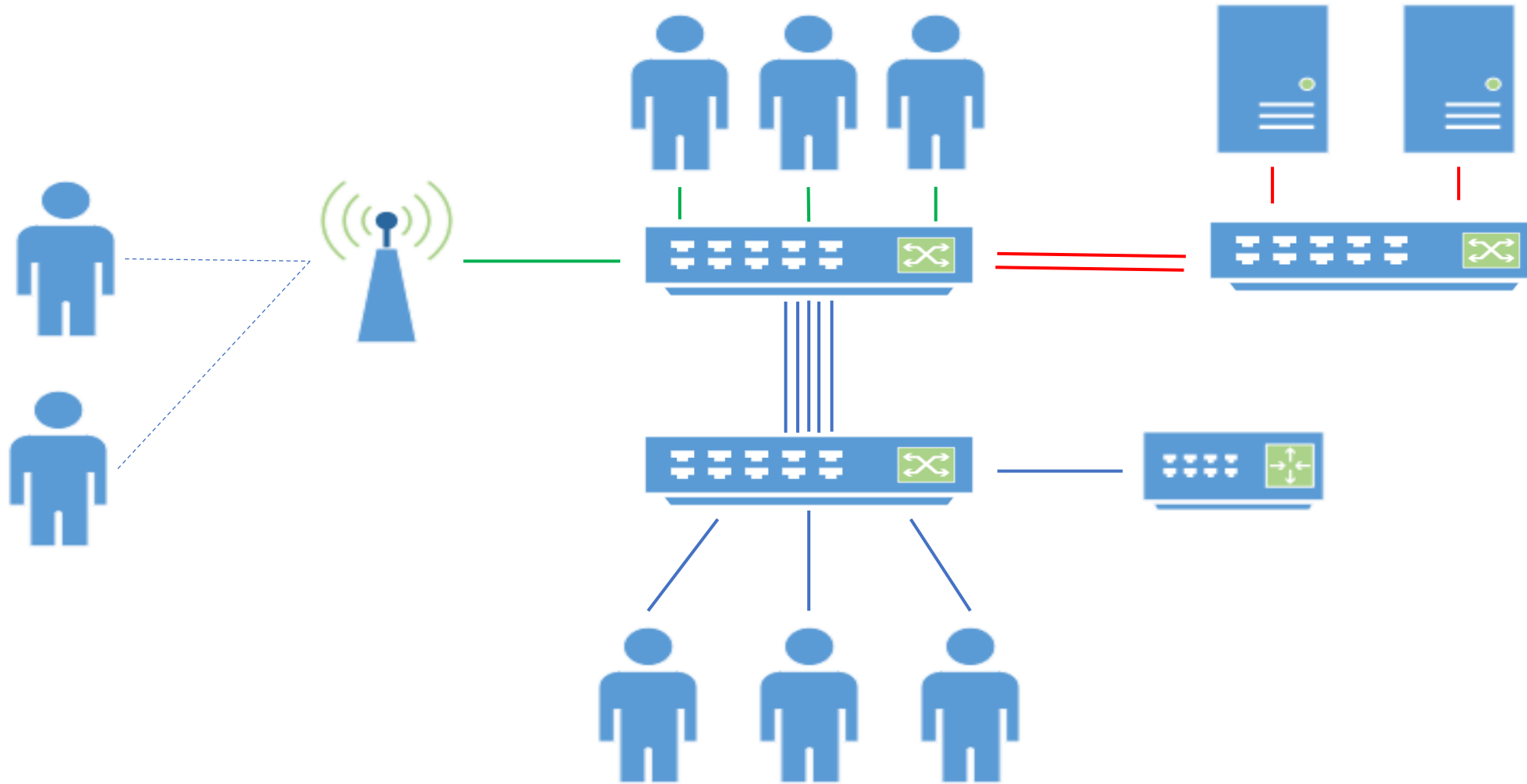
## Was ist LACP? – ein normales Netzwerk (früher)



## 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

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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
  - SNTP
  - 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"/> | <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

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Save Tools Wizard Help Surveillance Mode

**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 shows the D-Link web interface for a DGS-1210-10 switch. The left sidebar contains a tree view of configuration categories: System, VLAN, Voice VLAN, Auto Surveillance VLAN, L2 Functions, Multicast, SNMP, 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 is titled 'LACP Port Settings' and features a 'Safeguard' status indicator. Below the title, 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.

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admin - 192.168.10.1 Logout

Save Tools Wizard Help Surveillance Mode

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**
- Multicast
- SNMP
- LLDP
- L3 Functions
- QoS
- Security
- AAA
- ACL
- SNMP
- Monitoring

### LACP Port Settings

Safeguard

From Port: 01 To Port: 10 Activity: Passive Timeout: Short (3 sec) [Apply]

| 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

The screenshot shows the D-Link web management interface for a DGS-1100-10MPV2 switch. The left sidebar contains a tree view of configuration categories, with 'L2 Features' and 'Link Aggregation' highlighted. The main content area is titled 'Link Aggregation' and includes a 'Channel Group Information' section. This section contains four input fields: 'From Port' (set to eth5), 'To Port' (set to eth8), 'Group ID (1-8)' (set to 1), and 'Mode' (set to On). There are 'Add' and 'Delete Member Port' buttons to the right. A note states: 'Each Channel Group supports up to 8 member ports. Up to 8 Channel Groups.' Below this is a table with the header 'Total Entries: 0' and columns: 'Channel Group', 'Protocol', 'Max Ports', 'Member Number', and 'Member Ports'. The table is currently empty.

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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 interface for the DGS-1100-10MPV2 switch. The top navigation bar includes the D-Link logo, a 'Save' button, and menu items for 'Tools', 'Wizard', and 'Online Help'. The user is logged in as 'admin-192.168.10.16'. On the left, a sidebar menu shows the configuration tree with 'Link Aggregation' selected under 'L2 Features'. The main content area is titled 'Link Aggregation' and contains a 'Channel Group Information' section with input fields for 'From Port' (eth1), 'To Port' (eth1), 'Group ID (1-8)', and 'Mode' (On). Below this is a table showing one channel group entry: 'port channel 1' with a static protocol, 8 max ports, 4 member ports, and member ports eth5, eth6, eth7, and eth8. A 'Delete Channel' button is next to the entry.

**Link Aggregation**

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

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DGS-1520-28MP

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

RPS Link/Act Console Fan Error Mode Reset/ZTP

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) 32768 Apply

Load Balance Algorithm Source Destination MAC Apply

System ID

Channel Group Information

From Port To Port Mode

eth1/0/1 eth1/0 Static Add Delete Member Port

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 status bar shows various indicators for link status, PoE, and console access. The left sidebar contains a navigation tree with 'L2 Features' and 'Link Aggregation' highlighted. The main content area is titled 'Link Aggregation' and includes 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 settings:

- From Port: eth1/0/5
- To Port: eth1/0/8
- Group ID (1-32): 1
- Mode: Active (selected from a dropdown menu)

A red box highlights the 'Mode' dropdown menu, which shows the following options: Active, Static, Active, and Passive. The 'Active' option is currently selected.

Below the configuration fields, there is a table with the following columns: Channel Group, Protocol, Max Ports, Member Number, and Member Ports. The table currently shows 'Total Entries: 0'.

Buttons for 'Apply', 'Add', and 'Delete Member Port' are also visible.

# Die Konfiguration des DGS-1520

The screenshot displays the D-Link web management interface for a DGS-1520-28MP switch. The top header 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 navigation tree with 'Link Aggregation' selected under 'L2 Features'. The main content area is titled 'Link Aggregation' and contains the following configuration options:

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

Below these are 'Channel Group Information' fields:

- 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: 'Each Channel Group supports up to 8 member ports.'

A table shows the current configuration:

| 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

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Save Tools Wizard Help

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
- Multicast
- SNTP
- LLDP
- L3 Functions
- QoS
- Security
- AAA
- ACL
- SNMP
- Monitoring

VID Settings

VID: 10

VLAN Name: Test

Maximum 20 characters.

Back Apply

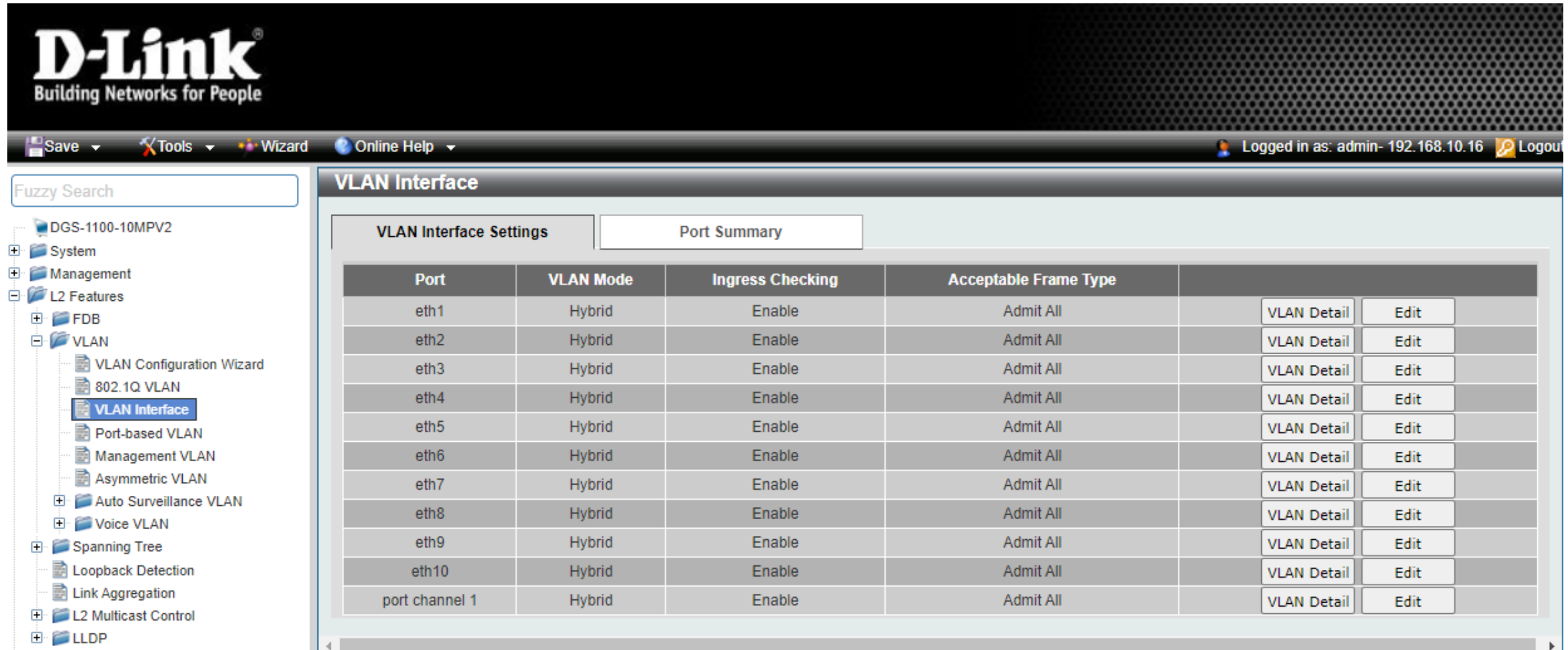
| Port       | Select All | 01                               | 02                               | 03                               | 04                               | 05                               | 06                               | 07                               | 08                               | 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"/> |

Safeguard

admin - 192.168.10.1 Logout



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



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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?

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