

Lab Course „RouterLab“

Virtual LAN (VLAN)

RouterLab Policies

- ❑ RouterLab = Experimental Platform
- ❑ Please do not ...
 - reserve more time than you need!
 - work on devices without reservations!
 - interfere with other users!
 - try to „hack“ the RouterLab
 - ...
- ❑ We trust you!
- ❑ In case of violations we will ban you from this course!
 - Note: We monitor user behavior

Definitions

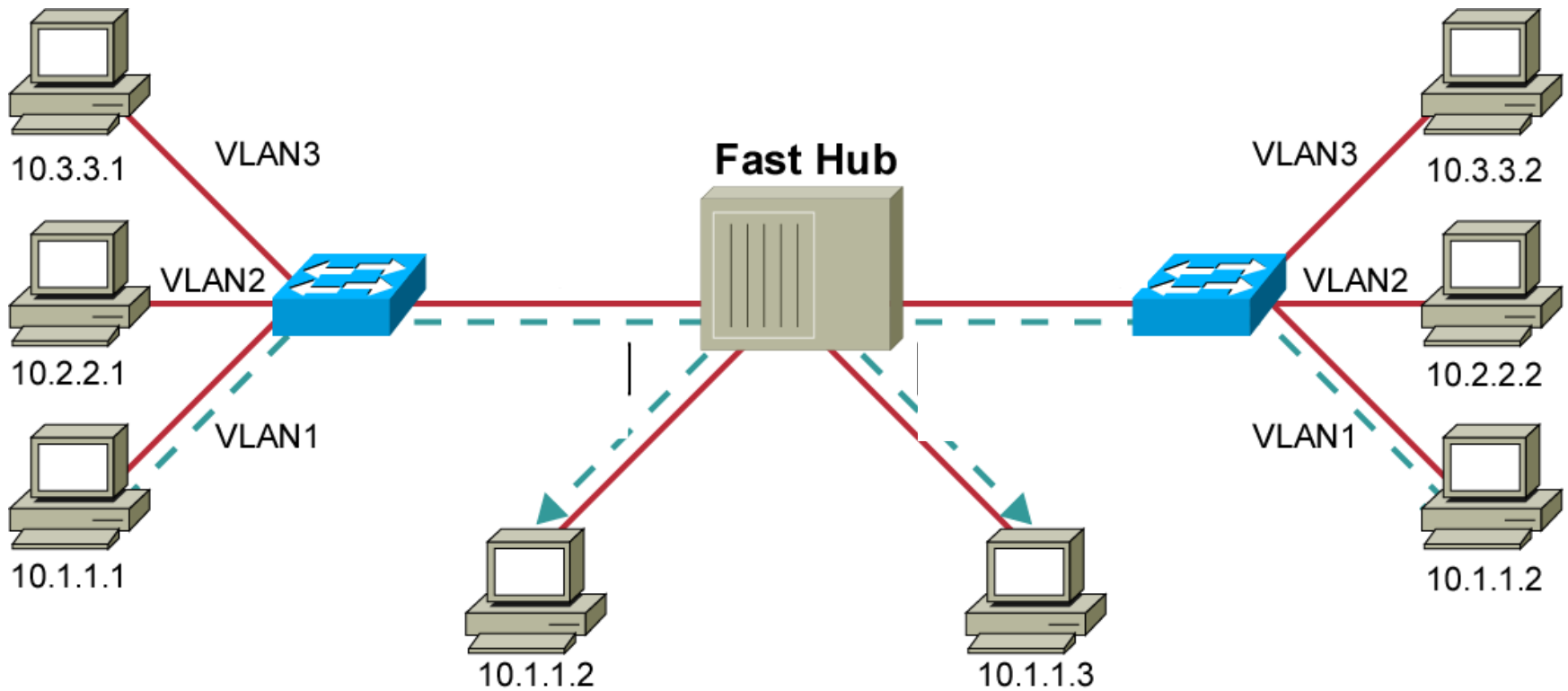
□ **LAN**

- broadcast domain
- Hubs or switches „connect“ different LAN segments
- Ethernet

□ **Virtual LAN (VLAN)**

- Group of devices can communicate with each other as if they were on the same LAN
- configured on switches (and routers)

VLAN Example



„Types“ of VLANs

❑ Post-based VLANs

- A switch port is exclusively used by one VLAN

❑ Trunking

- Required if multiple VLANs share the same physical link/ switch port
- A VLAN ID is added to the Ethernet header
- Switches forward Ethernet frame with VLAN ID X to all ports that are enabled for „trunking“ of X

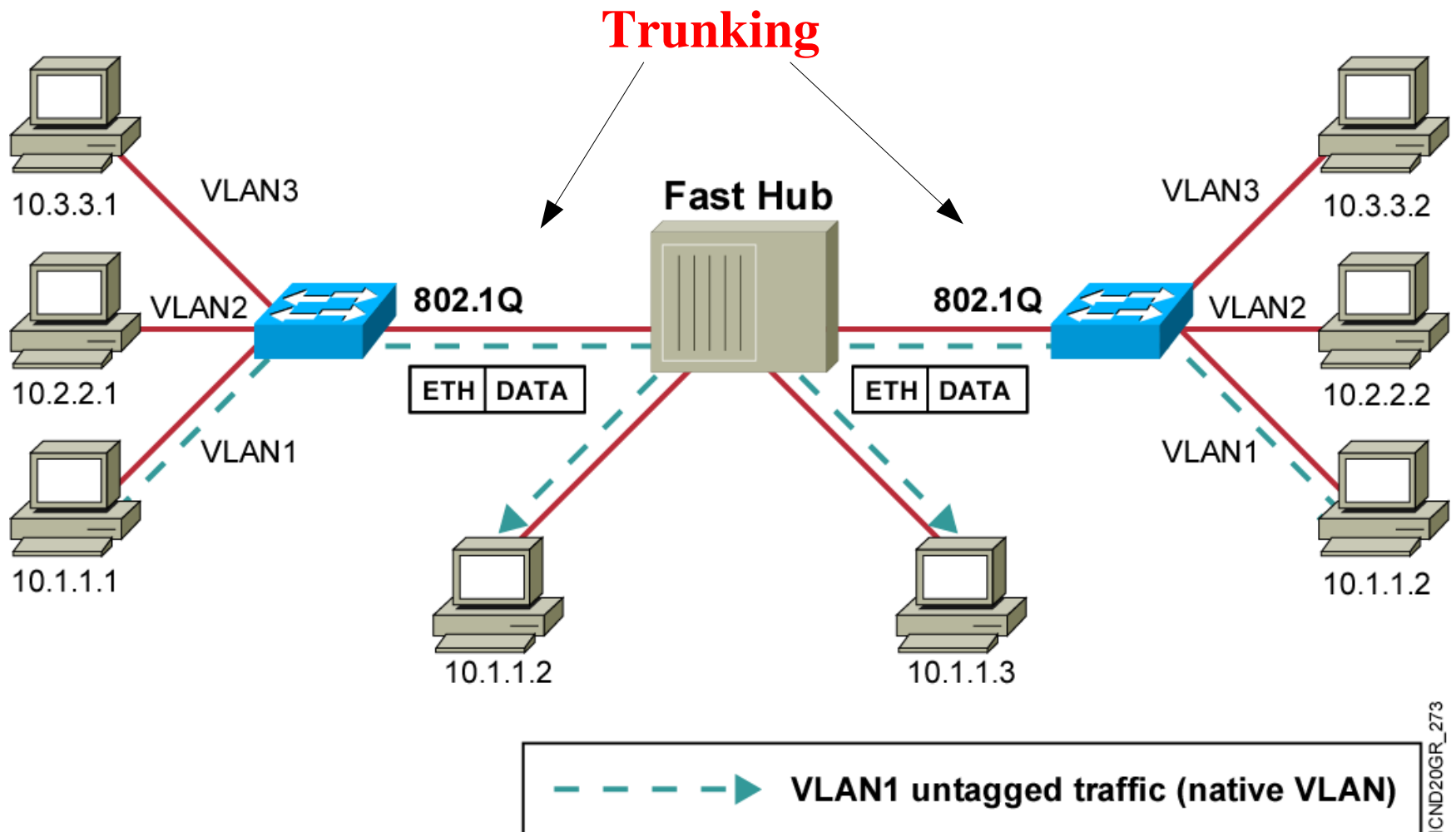
Port-based VLANs

- ❑ Each switchport
 - can be assigned to a VLAN
 - accepts incoming traffic from a specific VLAN
 - forwards packets to ports that belong to same VLAN
- ❑ Configuration
 - (config-if) switchport access vlan <vlan-id>
 - (config-if) switchport mode access

Trunking (802.1Q)

- ❑ Needed if multiple VLANs on same link
- ❑ **Switch**
 - (config-if) switchport trunk encapsulation dot1q
 - (config-if) switchport trunk allowed vlan 500,501
 - (config-if) switchport mode trunk
- ❑ **Cisco:** subinterface, e.g., f0/0.100
 - (config-subif) encapsulation dot1Q <vlan_id>
- ❑ **Juniper:** extra unit
 - vlan-tagging
 - unit 500 {vlan-id 500}
- ❑ **Loadgen:** extra interface ethX.<vlan-id>
 - vconfig add ethX <vlan-id>

(Native) VLANs



VLANs - Summary

❑ Rule of thumb

- Use access mode if a physical link corresponds to a single VLAN
 - No subinterfaces on routers/loadgens required

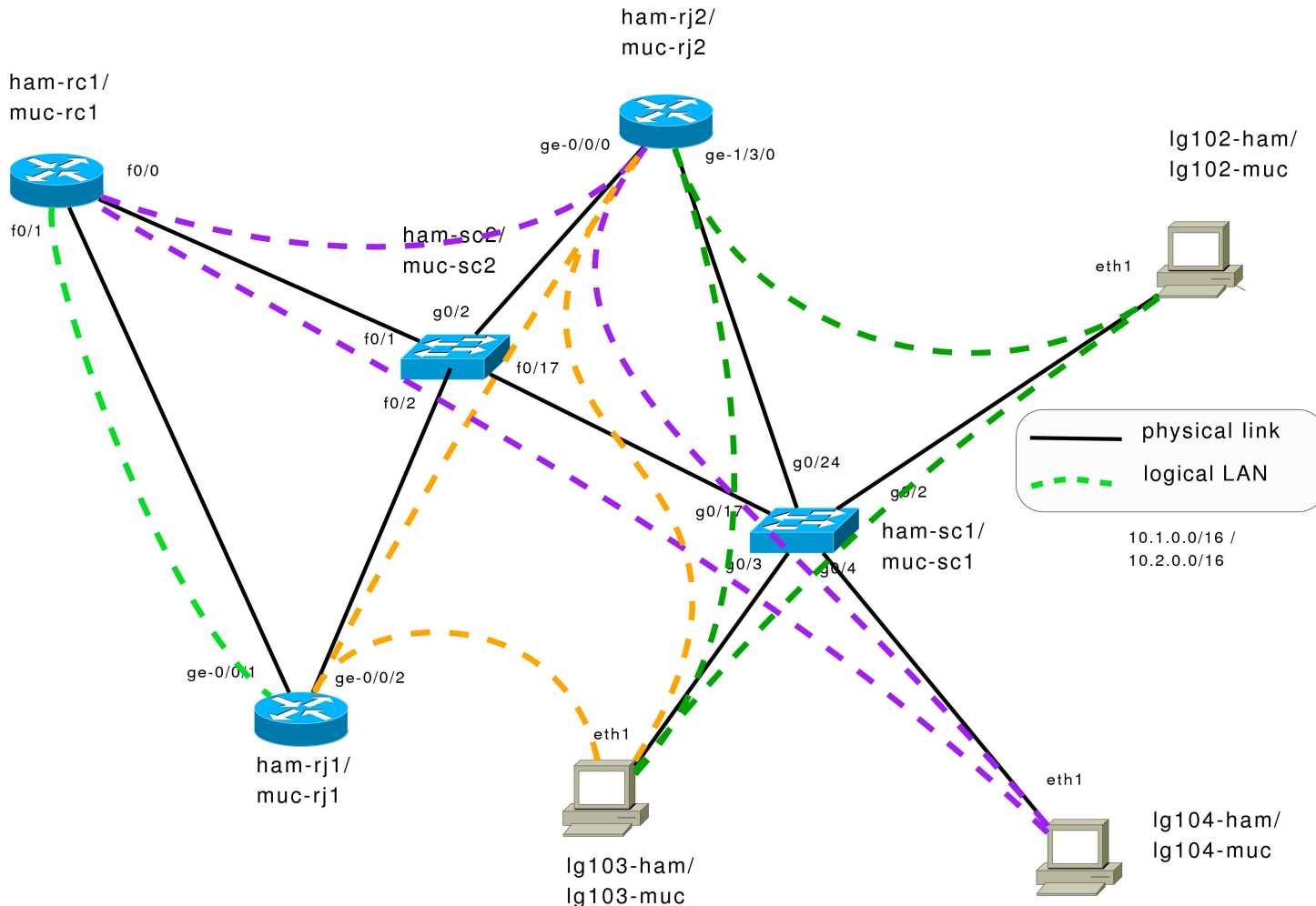
❑ The following is possible:

- Example: Send Ethernet frame on direct link from router to switch
- Router: Adds VLAN tag (vconfig)
- Switch: Removes VLAN tag on *outgoing* port (access mode) before forwarding

❑ More info in FAQ!!!

Worksheet - Question 1

- ❑ Configure VLANs
- ❑ Figure out whether to use access or trunk mode



Worksheet – Question 2

- ❑ Enable routing between VLANs
 - Devices in VLAN X should be able to communicate with devices in VLAN Y
 - Configure static routes