
Algorithm 1 MAC Address Authentication

Require: $Device_MAC$: MAC address of the connecting device
Require: $Authorized_List$: Set of authorized MAC addresses (whitelist)
Ensure: Access granted or Access denied

- 1: **Connection Detection:** When a device connects to a switch port
- 2: **Read MAC Address:** The switch reads $Device_MAC$ from received Ethernet frames
- 3: **Verification:**
- 4: **if** $Device_MAC \in Authorized_List$ **then**
- 5: Allow traffic on the port
- 6: $Port_Status \leftarrow active$
- 7: **Output:** "Access granted"
- 8: **else**
- 9: Block traffic on the port
- 10: Apply configured security policy:
 - 11: • **protect**: ignore unauthorized frames
 - 12: • **restrict**: ignore + log an alert
 - 13: • **shutdown**: disable the port
- 14: **Output:** "Access denied"
- 15: **end if**
- 16: **End of verification**
- 17: **Continuous Monitoring:**
- 18: **if** a new frame arrives with a different MAC address on the same port **then**
- 19: Go back to Step 3 (Verification)
- 20: **end if**
