System operacyjny AlliedWare PLUS i jego możliwości w przełącznikach Allied Telesis

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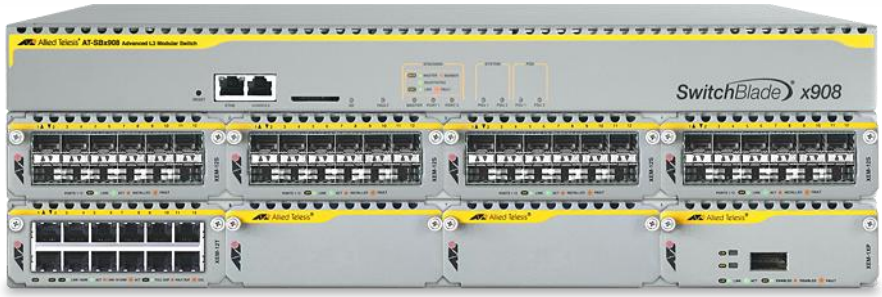
Agenda

- System operacyjny AlliedWare PLUS
- Skrypty i Triggery
- EPSR /Ethernet Protection Switching Ring/

AlliedWare Plus™ Platforms

- SwitchBlade® x908
  - » Advanced Layer 3 modular switch with 8 x 30GbE expansion bays



- Available expansion modules
  - » XEM-1XP: 10 GbE XFP module
  - » XEM-12S: 12 x SFP module
  - » XEM-12T: 12 x 10/100/1000T module
  - » XEM-STK: Stacking module

2002/95/EC RoHS COMPLIANT

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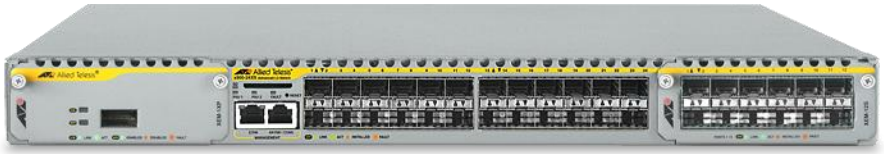
Allied Telesis

AlliedWare Plus™ Platforms

- x900-24XT
  - » 24-Port gigabit copper expandable advanced Layer 3+ switch

- x900-24XS
  - » 24-Port gigabit SFP expandable advanced Layer 3+ switch



- x900-12XT/S
  - » 12-Combo port gigabit expandable advanced Layer 3+ switch

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AlliedWare Plus™ Platforms

x600-24Ts
- 24 x 10/100/1000BASE-T (RJ-45) copper ports
- 4 x 1000BASE-X SFP combo ports
- 1 x expansion bay for AT-StackXG module

x600-24Ts -POE
- 24 x 10/100/1000BASE-T (RJ-45) copper ports with PoE (802.3af)
- 4 x 1000BASE-X SFP combo ports
- 2 x 24 Gbps stacking ports

x600-24Ts/XP
- 24 x 10/100/1000BASE-T (RJ-45) copper ports
- 4 x 1000BASE-X SFP combo ports
- 2 x XFP ports
- 1 x expansion bay for AT-StackXG module

x600-48Ts
- 44 x 10/100/1000BASE-T (RJ-45) copper ports
- 4 x 1000BASE-X SFP ports
- 1 x expansion bay for AT-StackXG module

x600-48Ts/XP
- 44 x 10/100/1000BASE-T (RJ-45) copper ports
- 4 x 1000BASE-X SFP ports
- 2 x XFP ports
- 1 x expansion bay for AT-StackXG module

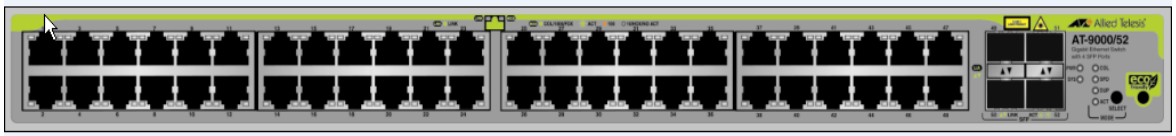
All models have the option of 48Gbps stacking

AlliedWare Plus™ Platforms

- AT-9000/28
  - » 24 10/100/1000 T ports + 4 10/100/1000 T / SFP ports. Layer 2 switch

- AT-9000/28SP
  - » 24 SFP ports + 4 10/100/1000 T / SFP ports. Layer 2 switch

- AT-9000/52
  - » 48 10/100/1000 T ports + 4 SFP ports. Layer 2 switch



2002/95/EC RoHS COMPLIANT

Why change the Operating System?

- Previous AlliedWare software
  - » Is built on a proprietary code-base
  - » Runs in a single memory area
  - » Has been continually stretched with growth in features / complexity
  - » Has no ‘protection’ for running software processes
    - *A problem in any area of code could potentially cause problems for the entire switch*

Why change the Operating System?

- AlliedWare Plus™
  - » Is a significant step forward in meeting the demands of the industry
  - » Provides solutions to some inherent limitations of current software
  - » Is the the operating system delivered with new Allied Telesis Labs – New Zealand (ATL-NZ) developed products

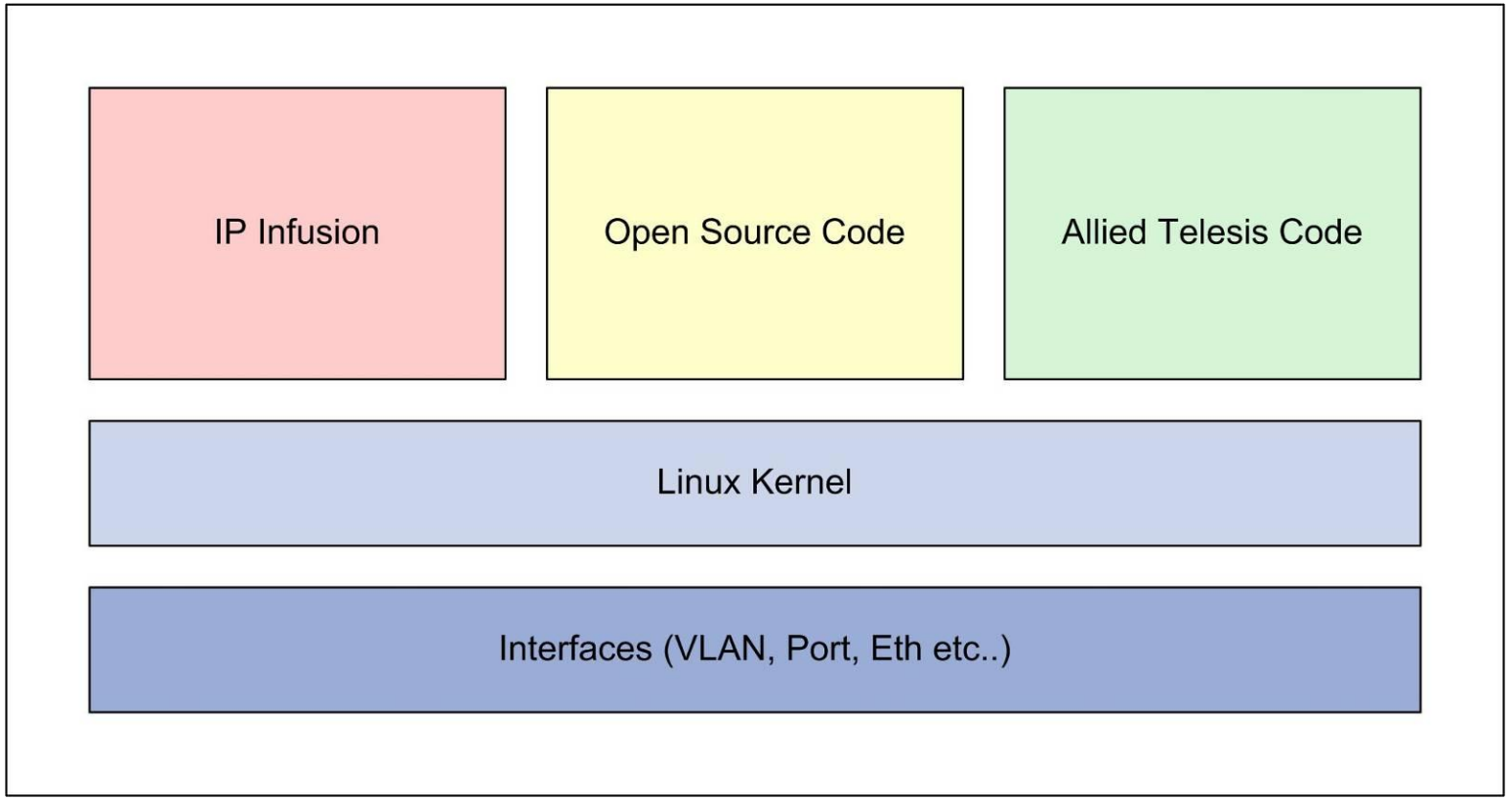
What is AlliedWare Plus™?

- AlliedWare Plus™ is constructed around a real-time operating system, with modular applications.

- AlliedWare Plus™ Architecture:
  - » Linux operating system kernel
  - » IP Infusion Layer 2/3 switching & routing feature set
  - » Open-source software modules
  - » Features ported from AlliedWare
  - » Features written specifically for AlliedWare Plus™

AlliedWare Plus™ Architecture

Conceptual view of the operating system architecture



AlliedWare Plus™ Architecture

- Linux Kernel
  - » Central component of AlliedWare Plus™ and implements:
    - *True multitasking*
    - *Virtual memory*
    - *Shared libraries*
    - *Memory management*
    - *Multi-stack networking environment including IPv4 and IPv6*
  - » Provides two key components in the AlliedWare Plus system:
    - *The operating system*
      - – Schedules other processes
      - – Interfaces to peripheral devices
    - *The routing stack*
      - – Linux TCP/IP stack for IPv4 and IPv6
      - – Interfaces with hardware and IP Infusion software

AlliedWare Plus™ Architecture

- IP Infusion
  - » Commercial software providing Layer 2 & 3 switching and routing solutions for communication equipment vendors
  - » Provides IP protocols and features for AlliedWare Plus™
  - » Offers switching and routing protocols in line with the latest industry standards and RFCs

AlliedWare Plus™ Architecture

- Open Source Software
  - » Available to the public, enabling modification / redistribution without fees
    - *Evolves through community cooperation - from individuals to large companies*
  - » AlliedWare Plus™ uses a number of open source software ‘modules’
    - *Providing bolt-on functionality*
    - *Allowing Allied Telesis to be part of the development community*
  - » Some of the open source features include:
    - *openSSH*
    - *openSSL*
    - *DHCP server & relay agent*
    - *and others*

AlliedWare Plus™ Architecture

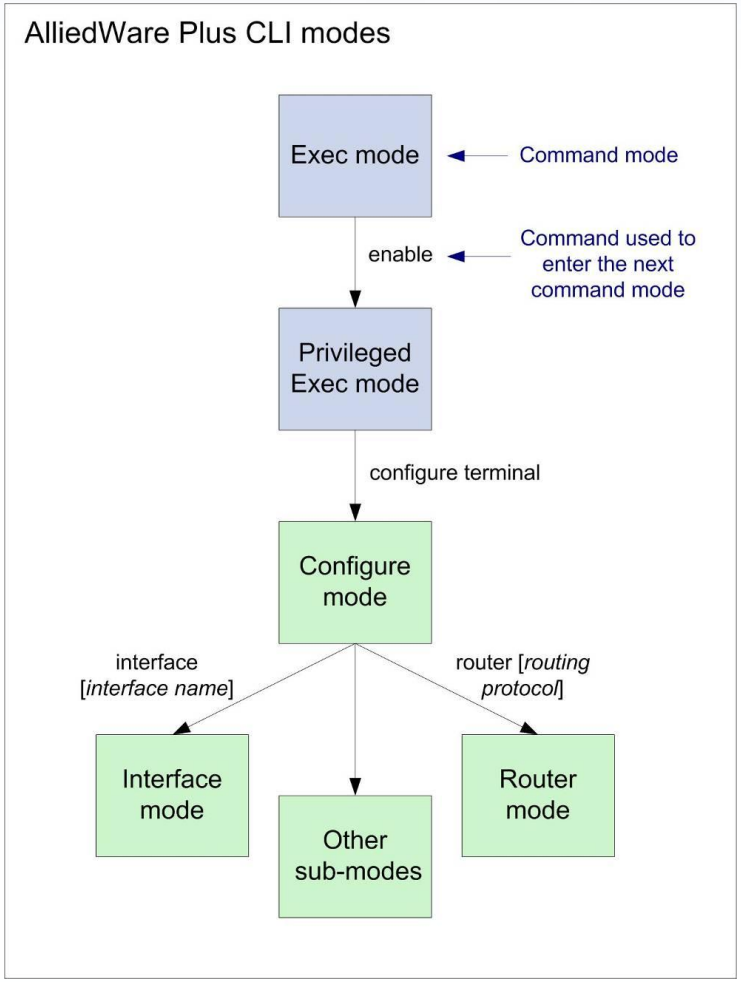
- Allied Telesis developed software
  - » Significant and innovative features which add value and provide key functionality
  - » For example:
    - *Virtual Chassis Stacking*
    - *Quality of Service (QoS)*
    - *Ethernet Protection Switched Rings (EPSR)*
    - *Scripts & Triggers*
    - *and many more*

AlliedWare Plus™ Structure

- AlliedWare Plus™ incorporates an industry standard

  Command Line Interface (CLI)

- Network professionals will find using the new CLI to be instinctive and comfortable



AlliedWare Plus™ Configuration example

```
awplus>enable
awplus#configure terminal
awplus(config)#vlan database
awplus(config-vlan)#vlan 2 name vlan2
 awplus(config-vlan)#exit

 awplus(config)#interface port1.1.1-port1.1.4
 awplus(config-if)#switchport access vlan 2

 awplus(config)#interface vlan2
 awplus(config-if)#ip address 192.168.1.1/24
 awplus(config-if)#exit
```

AlliedWare Plus™ Benefits

- Software Benefits

  - » Modular Operating System
    - *High speed, high quality new feature development*
    - *Increased ability to support future applications and target markets*

  - » Increased software robustness
    - *Real-time OS with modular applications that run as separate processes*
    - *Linux OS & other processes do not affect one another - high fault tolerance*

  - » Decreased development time
    - *Third party SW quickly provides an industry standard base feature set*
    - *Improved ability to efficiently maintain code and respond to customer issues*
    - *Rapid porting of AlliedWare Plus™ to new hardware platforms*

AlliedWare Plus™ Benefits

- Software Benefits

  - » Advanced feature platform
    - *Easier collaboration with other Allied Telesis engineering groups*
    - *Innovative new features developed that deliver unique value to AT*

  - » Industry standard command line
    - *Improved usability and customer experience*
    - *Networking professionals familiar with more 'generic' CLI*

  - » Competitors
    - *Keep Allied Telesis offering high-value, high feature networking products*
    - *Benefits of AlliedWare Plus™ increase confidence of sales personnel when competing with other networking vendors for business.*

AlliedWare Plus™ Benefits

- Customer Benefits

  - » Increased reliability
    - *High availability for the Enterprise core*
    - *Confidence for customers in their network infrastructure*

  - » Greater OS functionality
    - *Third party code provides comprehensive protocol implementations*
    - *Switching and routing protocols in line with the latest standards & RFCs*
    - *Innovative new AT developed features to meet tomorrow's network needs*

  - » Improved usability
    - *Industry standard CLI beneficial for businesses with limited IT support resources – less training and easier staff recruitment*

AlliedWare Plus™ Feature Highlights

- Industry-standard command line (CLI)
  - Easy to learn and use
  - Incorporates best of AlliedWare features (e.g. Triggers)
- Virtual Chassis Stacking
  - High bandwidth, high availability
  - Single IP address for simpler management
  - XEM hot-swap for easier & faster maintenance
- High-Availability Software
  - Separate processes running in protected memory spaces
  - Independent process monitoring
  - Process health-checks

Agenda

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Scripts & Triggers

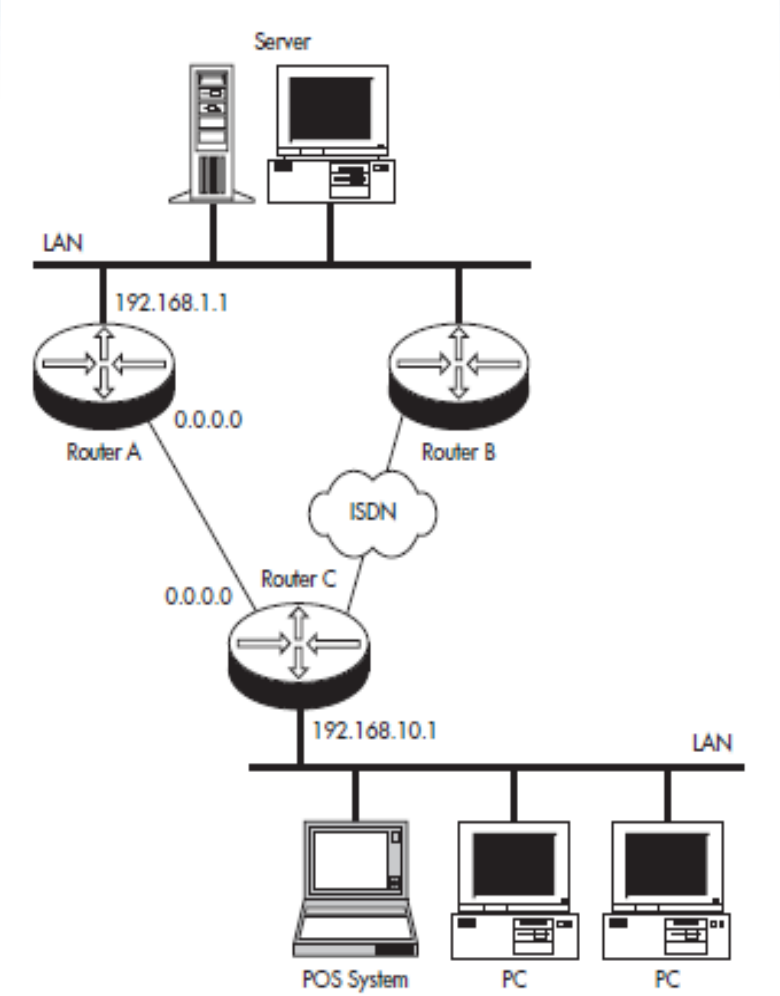
- Skrypt – zbiór poleceń systemu operacyjnego AW+ zebranych w jednym zbiorze wykonywalnym o rozszerzeniu .scp

- Może zawierać dowolną listę poleceń
- test.scp :
- ----------
- enable
- show interface port1.0.1
- wait 10
- show interface port1.0.1
- ----------

Scripts & Triggers

- Trigger – są mechanizmem wyzwalającym uruchomienie określonego skryptu .scp.
- Uruchomienie następuje po wystąpieniu jednego z poniższych zdarzeń:
  - CPU
  - Memory
  - Interface
  - Periodic
  - Ping-pool
  - Reboot
  - Stack master-fail
  - Stack member
  - Stack link
  - Time

Scripts & Triggers



Trigger Ping-polling lub
Interface/up-down/

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EPSR – Ethernet Protection Switching Ring

Ethernet Protection Switched Rings (EPSR) jest alternatywnym protokół nadmiarowiości L2

- STP
- RSPT/MSTP

EPSR – Ethernet Protection Switching Ring

Ethernet Protection Switched Rings (EPSR)

- Prevents loops in ring-based Ethernet networks
- Minimizes the impact of failure by diverting traffic around the failure point (sub 50 ms)
- Interoperates with standard Ethernet functions including:
  - QoS, IGMP, VLAN Double Tagging, Filtering
- iMap interoperability

Provides high availability for mission critical traffic, preventing loss of voice, video or data in the event of failure

Avoid down-time in your core enterprise or service provider network

EPSR – Normal Operation

Domain consists of:

- One Control VLAN
- Data VLANs 1..N
- Master Node
- Transit Nodes

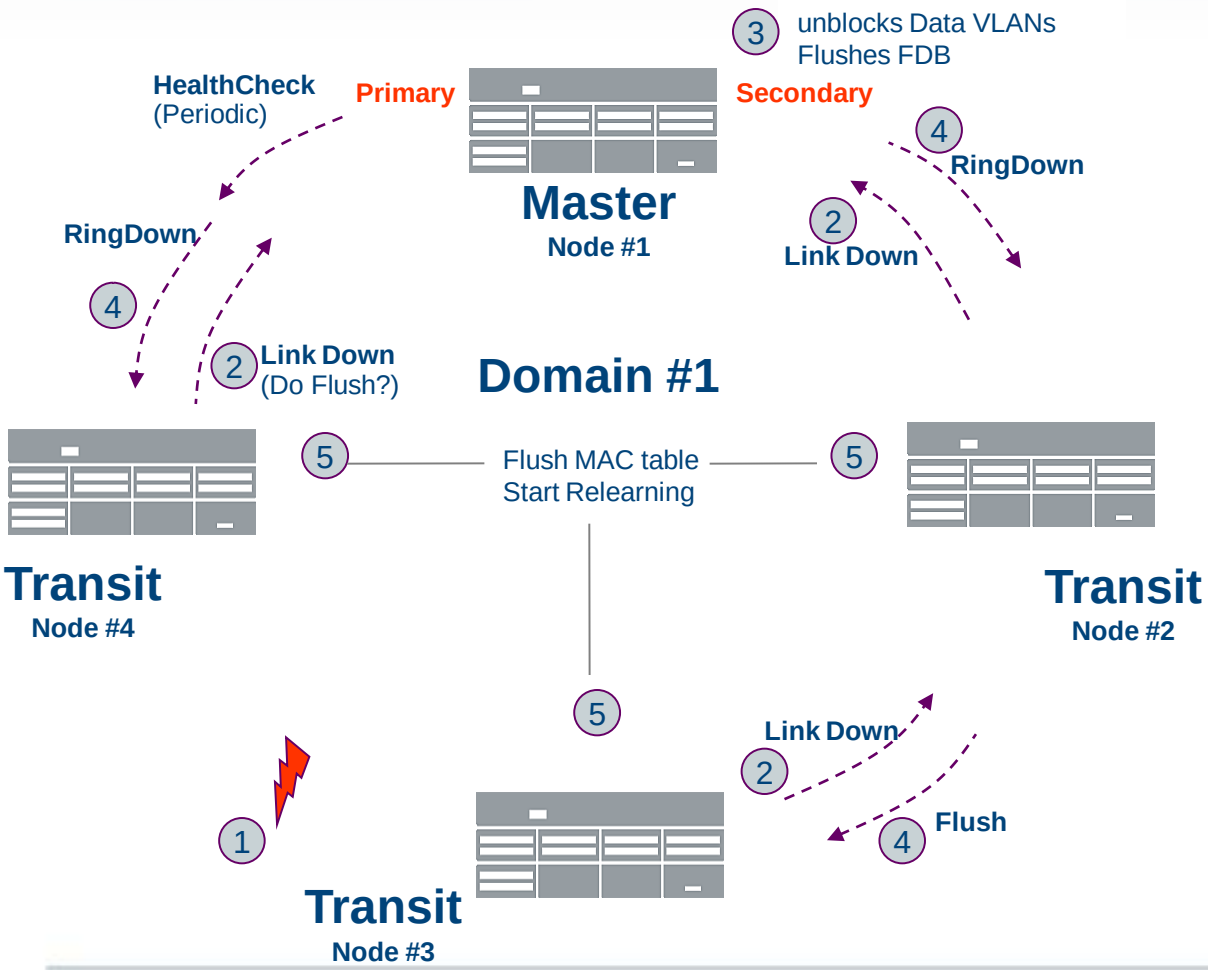
Master Node:

- Sends Periodic *HealthCheck* messages over Control VLAN
- Primary Port
  - Sends and Receives ALL VLANs
- Secondary Port
  - Receives Control VLAN
  - Blocks Data VLANs
- Detects Failure Conditions:
  - Transit reports failure
  - No receipt of HealthCheck

Transit Node:

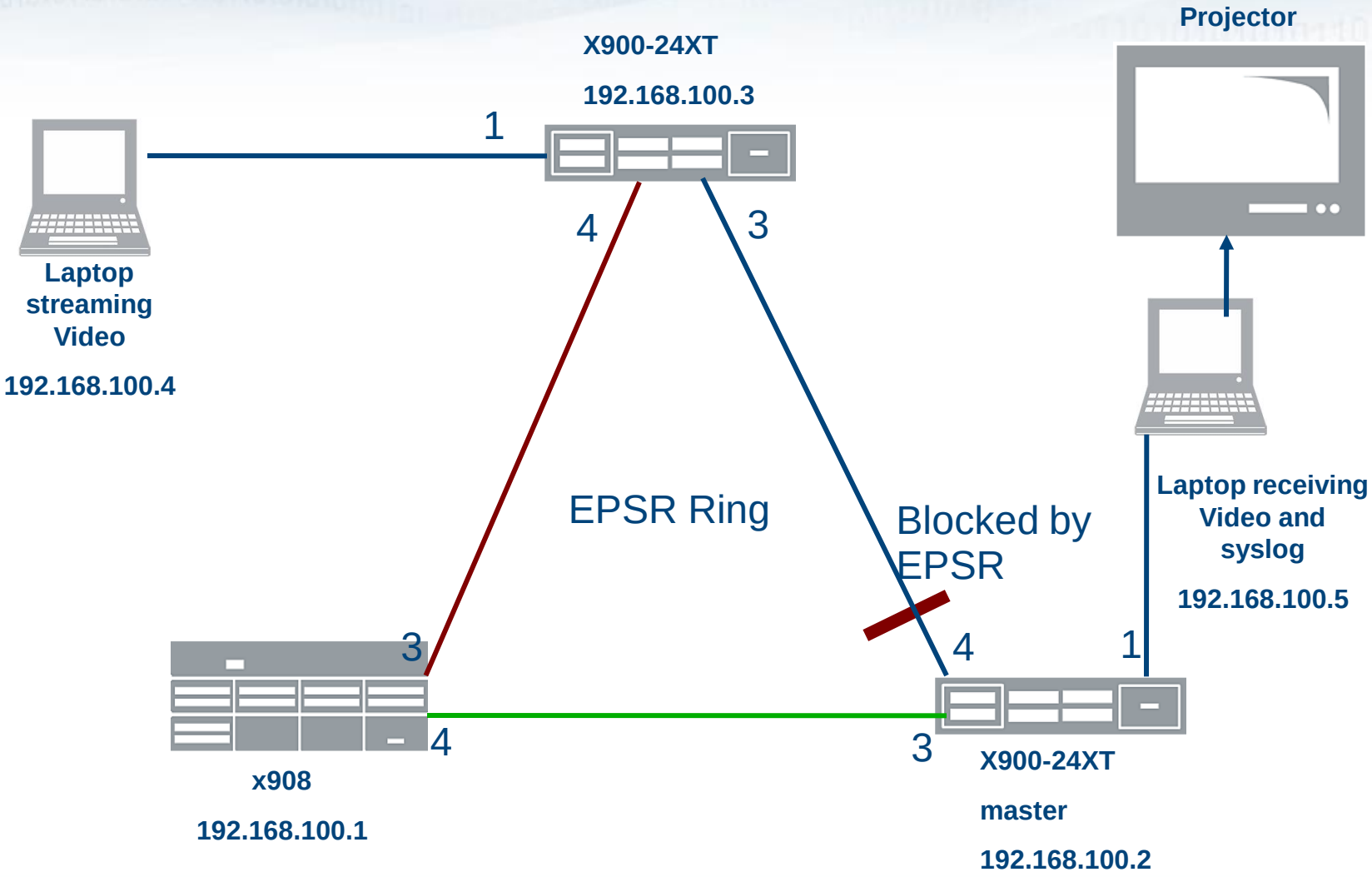
- Reports Failures
- Flushes FDB

EPSR – Failure Condition



- Detect Link Failure
- Send *Link Down* to Master
- Master Receives Link Down
  - Unblock Secondary Port
  - Flush FDB
- Notify Transit Nodes by sending *RingDown*
- Transit Nodes Receive RingDown
  - Flush FDB
  - Relearn new location of MAC addresses
- 50ms path restored

SwitchBlade x908 – EPSR Resilience



Configuration VLAN

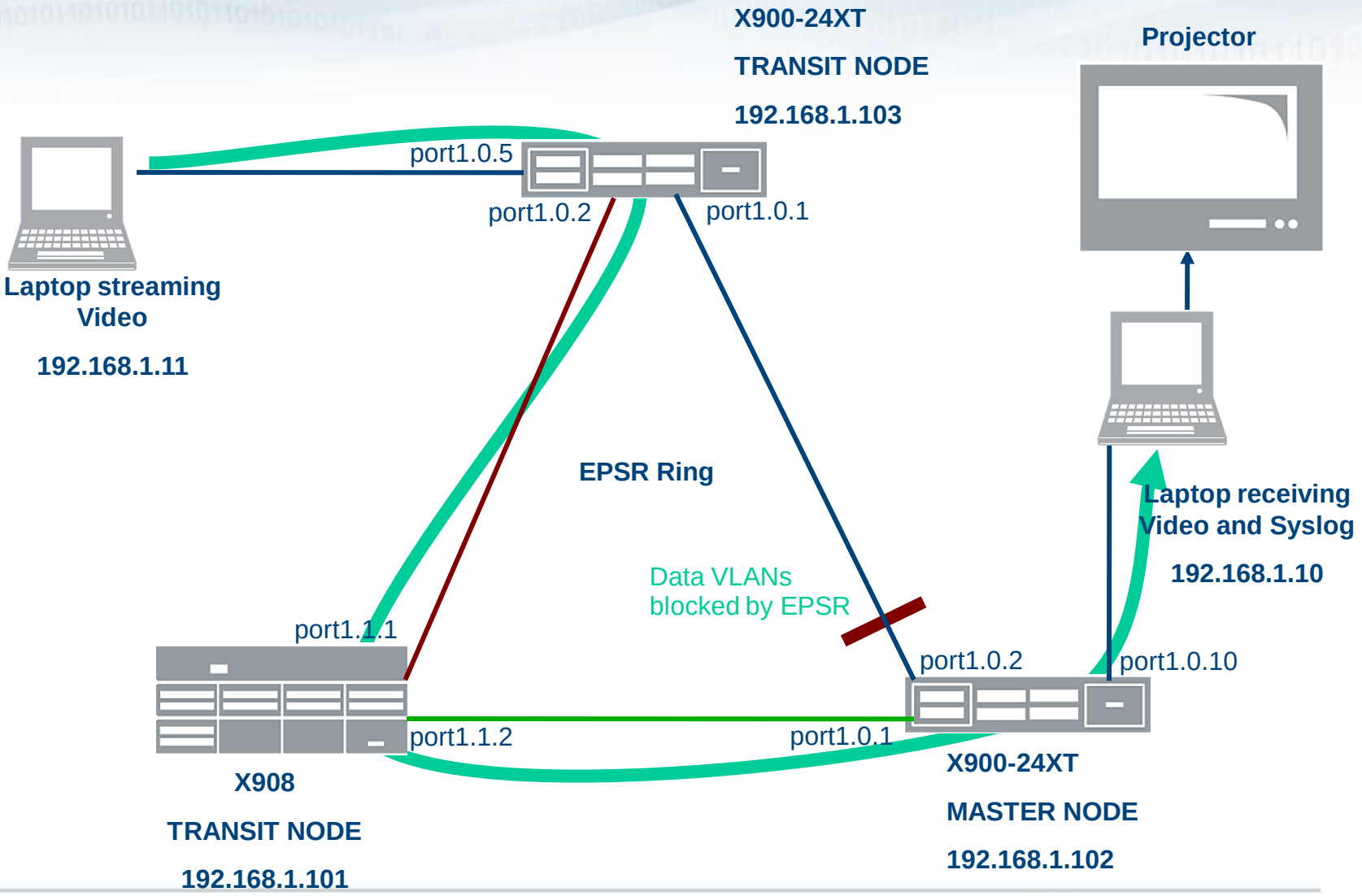
```
vlan database
 vlan 100 name data-vlan
 vlan 500 name control-vlan
 vlan 100,500 state enable
!
interface port1.0.1-1.0.2
 switchport
 switchport mode access
 switchport access vlan 100
!
interface port1.0.3-1.0.4
 switchport
 switchport mode trunk
 switchport trunk allowed vlan add 100,500
 switchport trunk native vlan none
```

Configuration EPSR

- Master:
- epsr configuration
- epsr epsr-name mode master controlvlan 500 primaryport port1.0.3
- epsr epsr-name datavlan 100
- epsr epsr-name state enabled

- Transits:
- epsr configuration
- epsr epsr-name mode transit controlvlan 500
- epsr epsr-name datavlan 100
- epsr epsr-name state enabled

SwitchBlade x908 – EPSR Resilience demo



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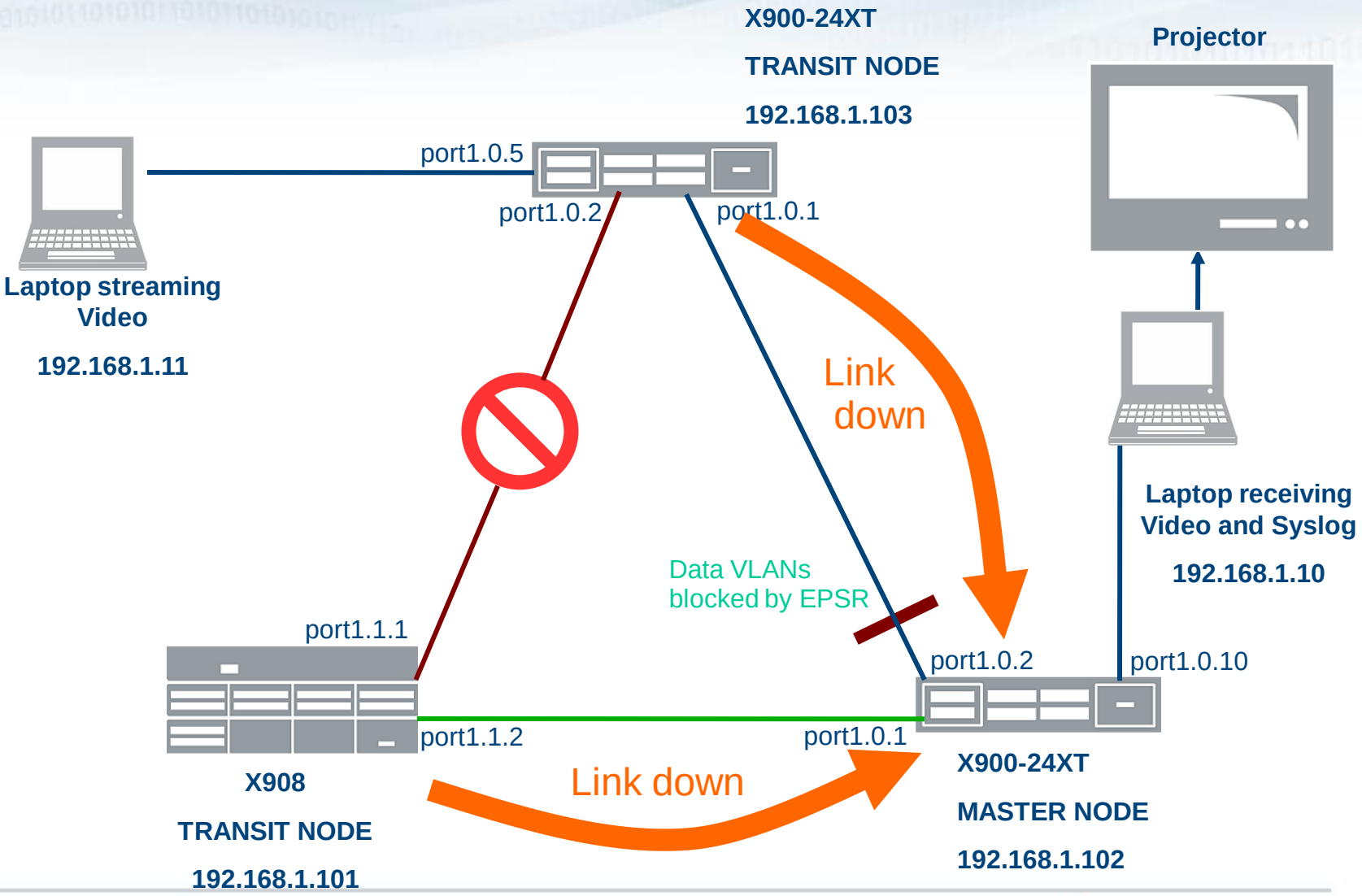

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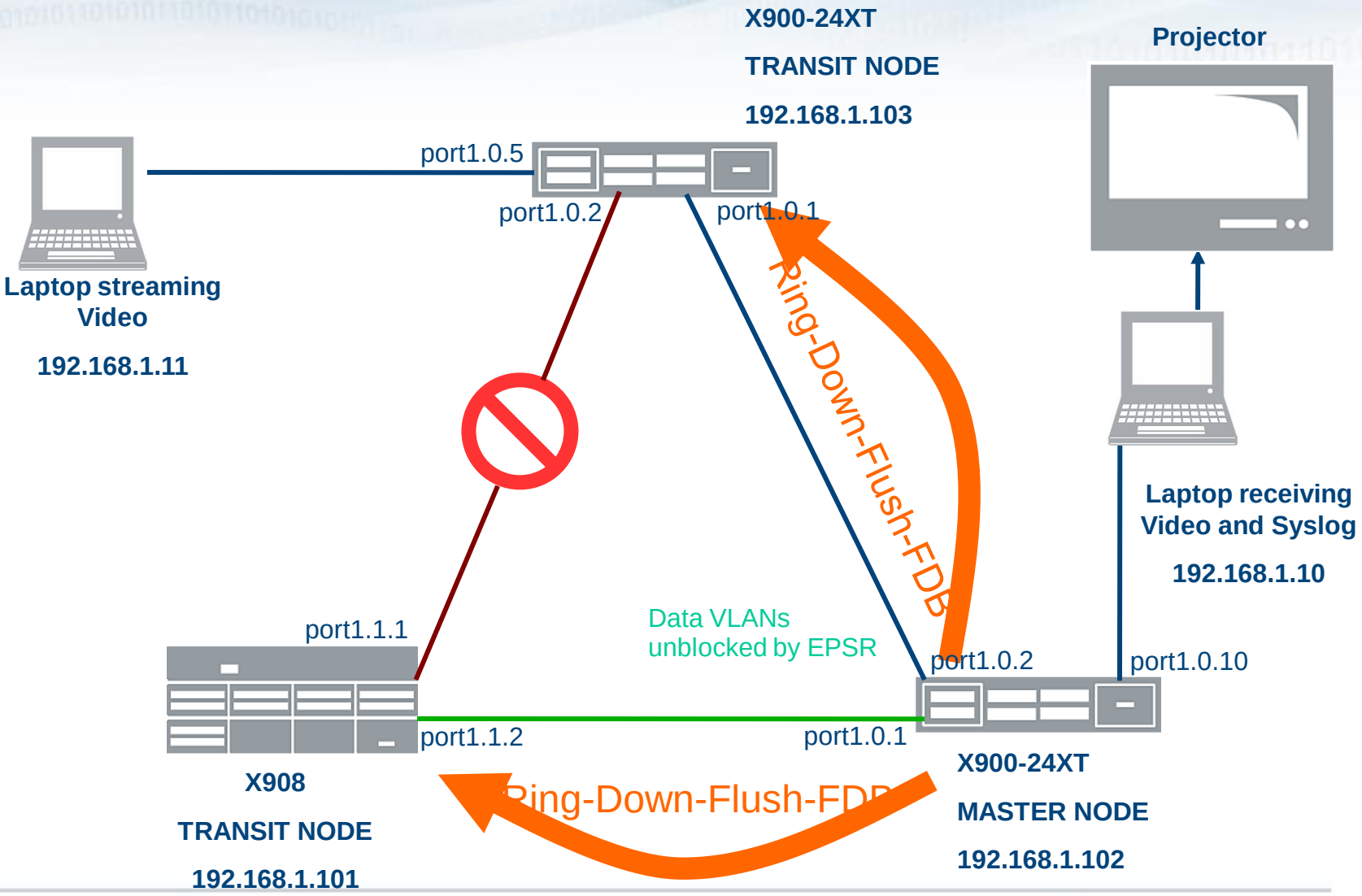

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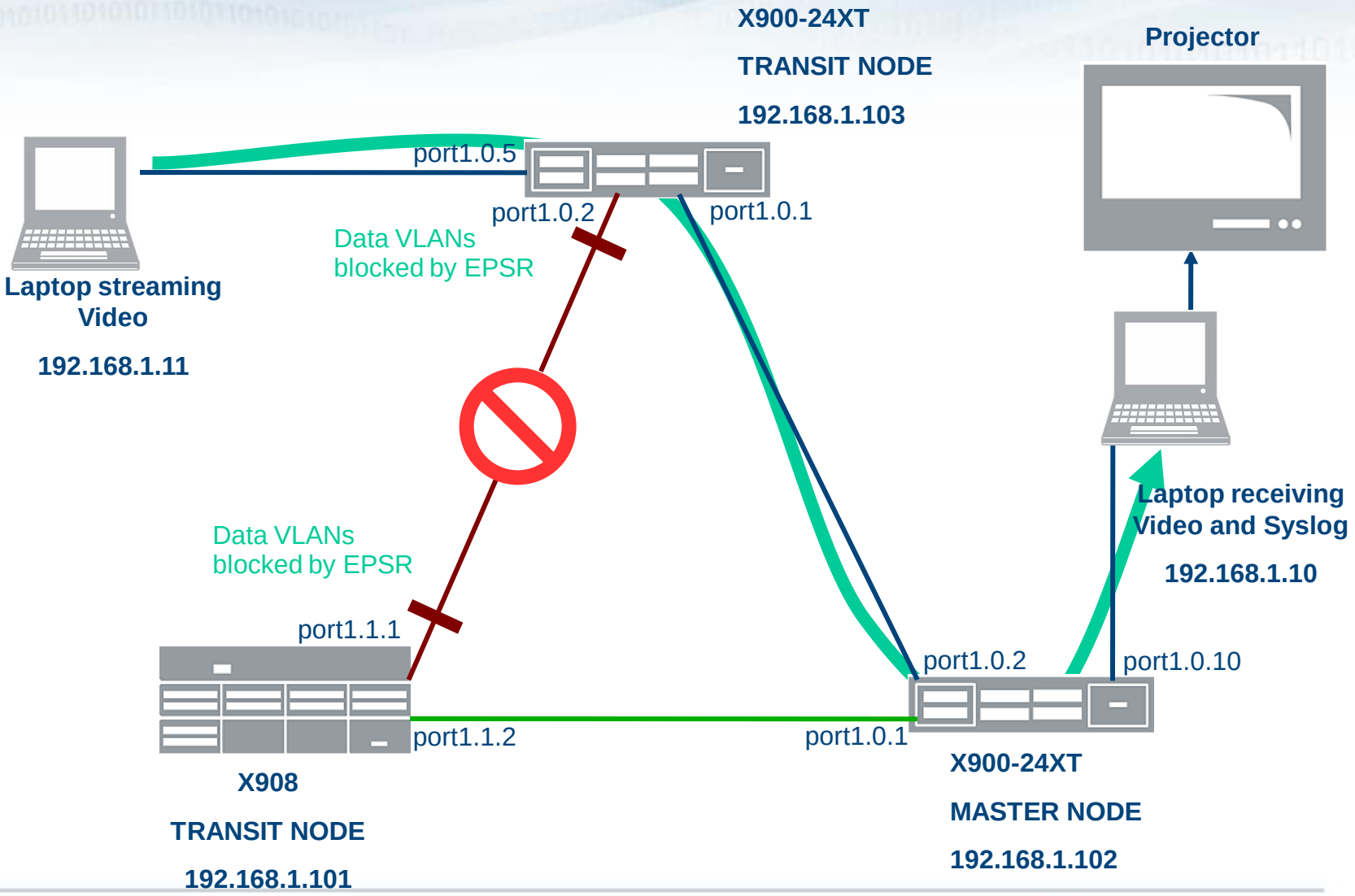

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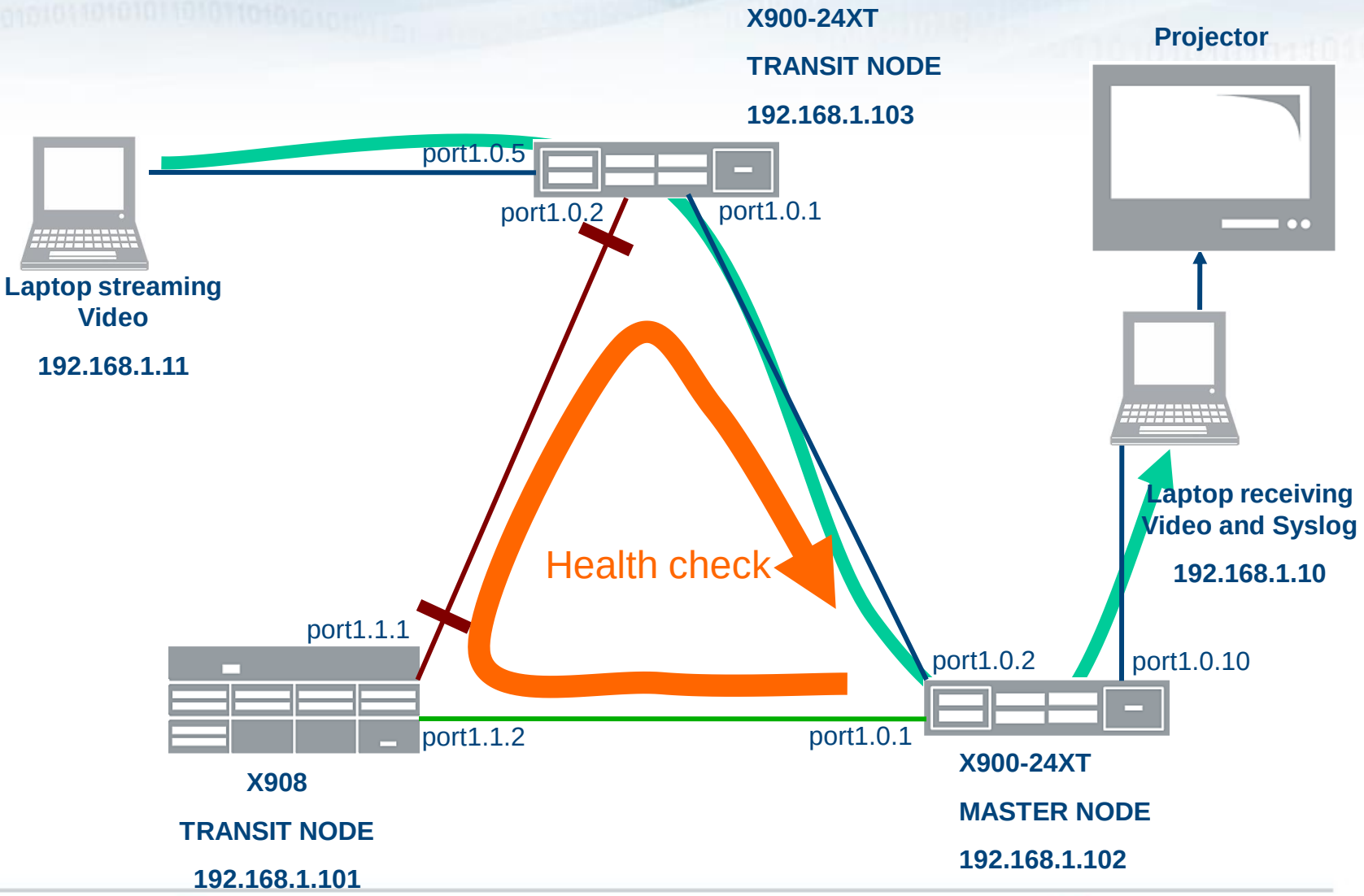

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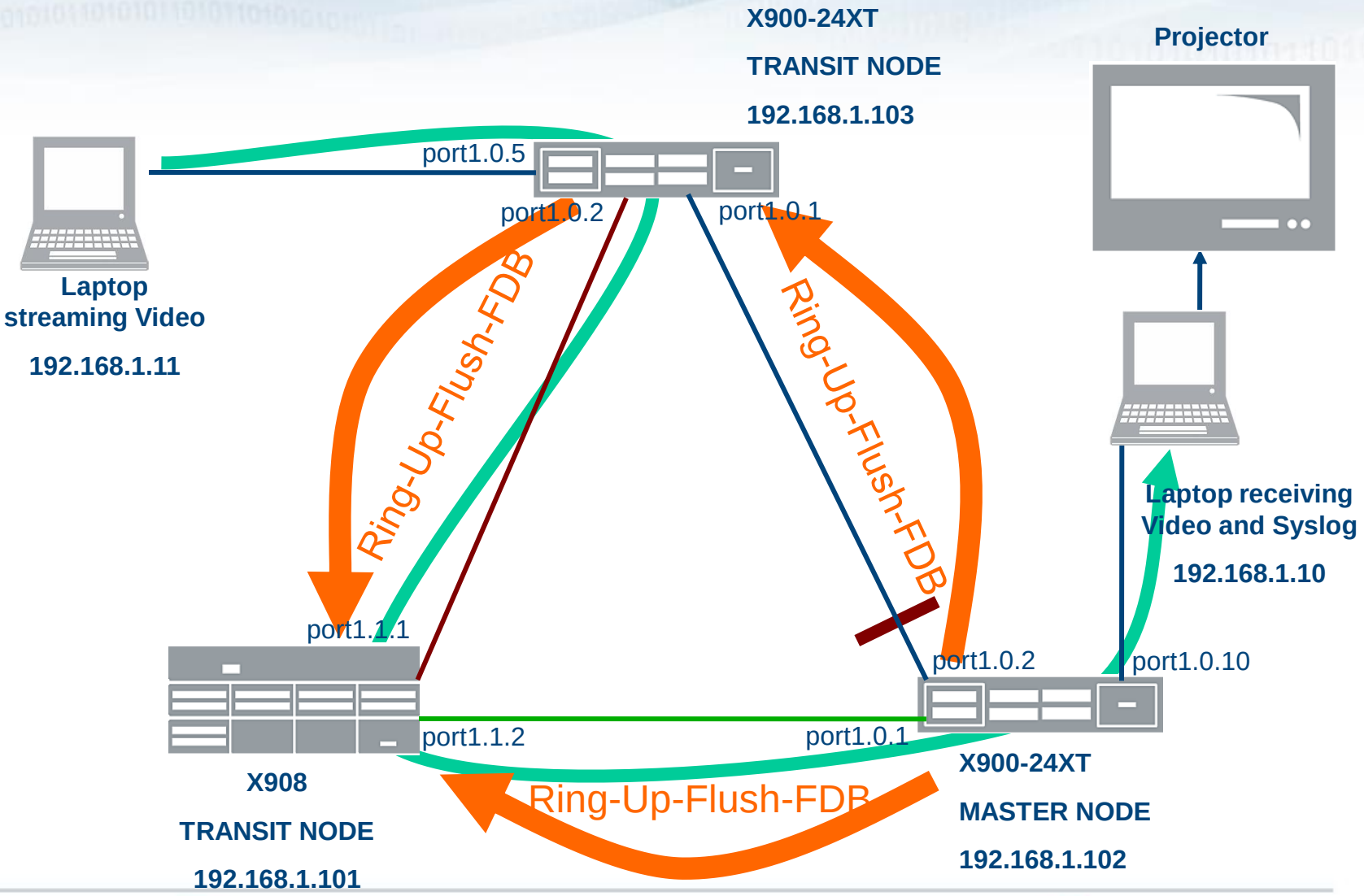


SwitchBlade x908 – EPSR Resilience demo

Generator ruchu

Router 192.168.100.1

Wysyła co 20ms pakiet UDP na adres 192.168.100.5

X900-24XT

192.168.100.3

1

4

3

Projector

NIEBIESKI

ZIELONY

EPSR Ring

Blocked by EPSR

Laptop z Ethereal

192.168.100.5

3

4

4

1

3

x908

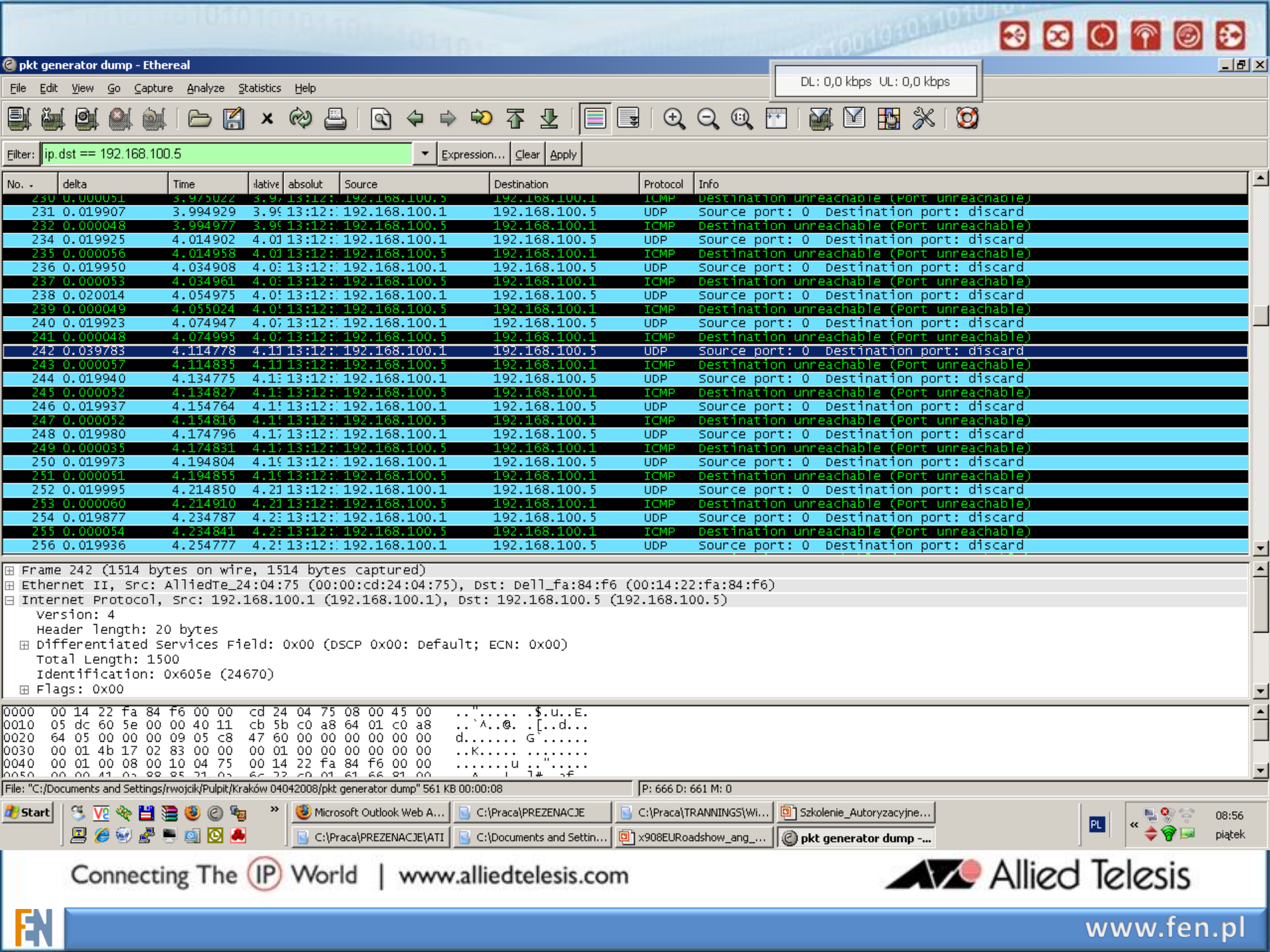
192.168.100.1

CZERWONY

X900-24XT

master

192.168.100.2



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