



# Laboratório de Projeto Integrado

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# Importância da Cibersegurança

- Proteção de dados pessoais
- Prevenção de fraudes e crimes cibernéticos
- Proteção de empresas e infraestruturas
- Proteção da privacidade



# Testes de Vulnerabilidade de Sistemas

- Protocolo Spanning-Tree
- DHCP
- ARP Spoofing
- BGP-Hijacking
- OSPF
- Vlan Hooping
- Brute Force Password
- SYN Flood Attack
- NAT Slipstream



# Spanning-Tree DoS Attack



O que é o protocolo Spanning Tree?

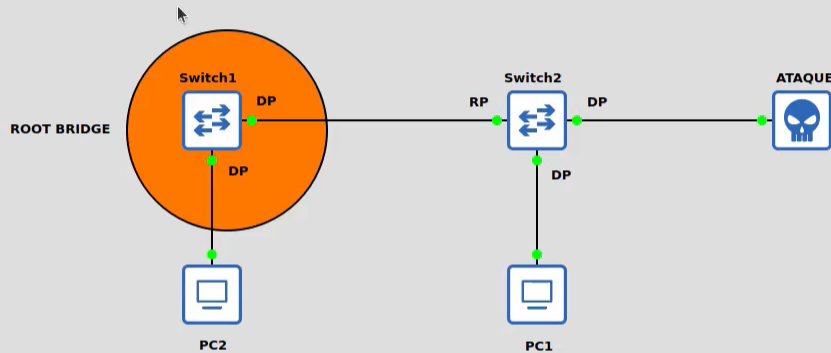


Como é que se realiza a eleição da raiz?



Em que consiste este ataque?





Topology Summary

- Node
  - ATAQUE
  - PC1
  - PC2
  - Switch1
  - Switch2

Servers Summary

- ruben CPU 21.3%, RAM 1...

Console

GNS3 management console.  
Running GNS3 version 2.2.38 on Linux (64-bit) with Python 3.10.7 Qt 5.15.6 and PyGNS3 1.3.7.  
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Use Help -> GNS3 Doctor to detect common issues.

=>

# STP ATTACK

## Spanning-Tree DoS Defense

- O que podemos fazer para prevenir este tipo de vulnerabilidades?



WARNING!

 Copiar  Colar  Procurar

```

*May 30 09:45:20.120: %LINK-3-UPDOWN: Interface GigabitEthernet1/1, changed state to down
*May 30 09:45:20.120: %LINK-3-UPDOWN: Interface GigabitEthernet1/0, changed state to down
*May 30 09:45:20.121: %LINK-3-UPDOWN: Interface GigabitEthernet0/3, changed state to down
*May 30 09:45:20.121: %LINK-3-UPDOWN: Interface GigabitEthernet0/2, changed state to up
*May 30 09:45:20.122: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to up
*May 30 09:45:20.122: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*May 30 09:45:22.247: %SYS-5-RESTART: System restarted --
Cisco IOS Software, vios_l2 Software (vios_l2-ADVENTERPRISEK9-M), Experimental Version 15.2(20200924:215240) [sweickge-sep24-2020-l2io
l-release 135]
Copyright (c) 1986-2020 by Cisco Systems, Inc.
Compiled Tue 29-Sep-20 11:53 by sweickge
*May 30 09:45:22.262: %PNP-6-PNP DISCOVERY STOPPED: PnP Discovery stopped (Startup Config Present)
*May 30 09:46:02.919: %PLATFORM-5-SIGNATURE_VERIFIED: Image 'flash0:/vios_l2-adventerprisek9-m' passed code signing verification4 bit
RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)
Failed to generate persistent self-signed certificate.
Secure server will use temporary self-signed certificate.

*May 30 09:46:11.012: %SSH-5-ENABLED: SSH 1.99 has been enabled
IOSv - Cisco Systems Confidential -

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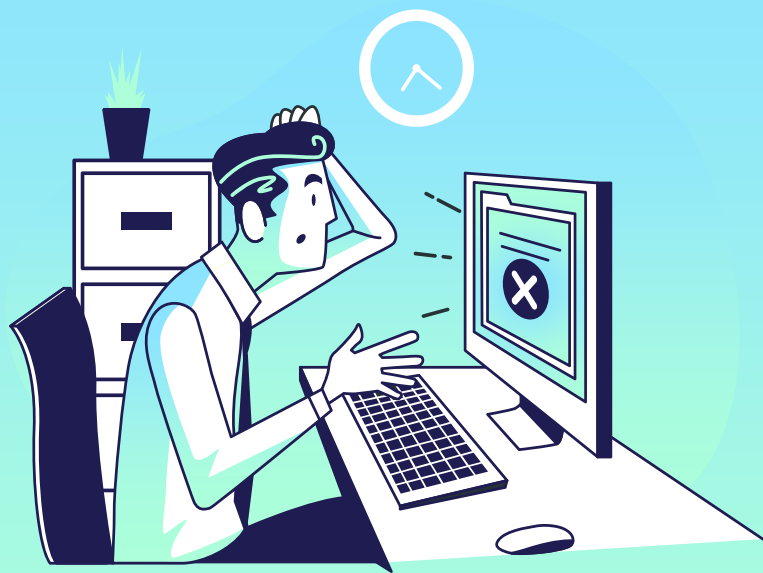
Switch>
Switch>
Switch>
Switch>en
Switch#

```

Switch2 

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 $\Rightarrow$



# **DHCP SPOOFING ATTACK (DoS)**



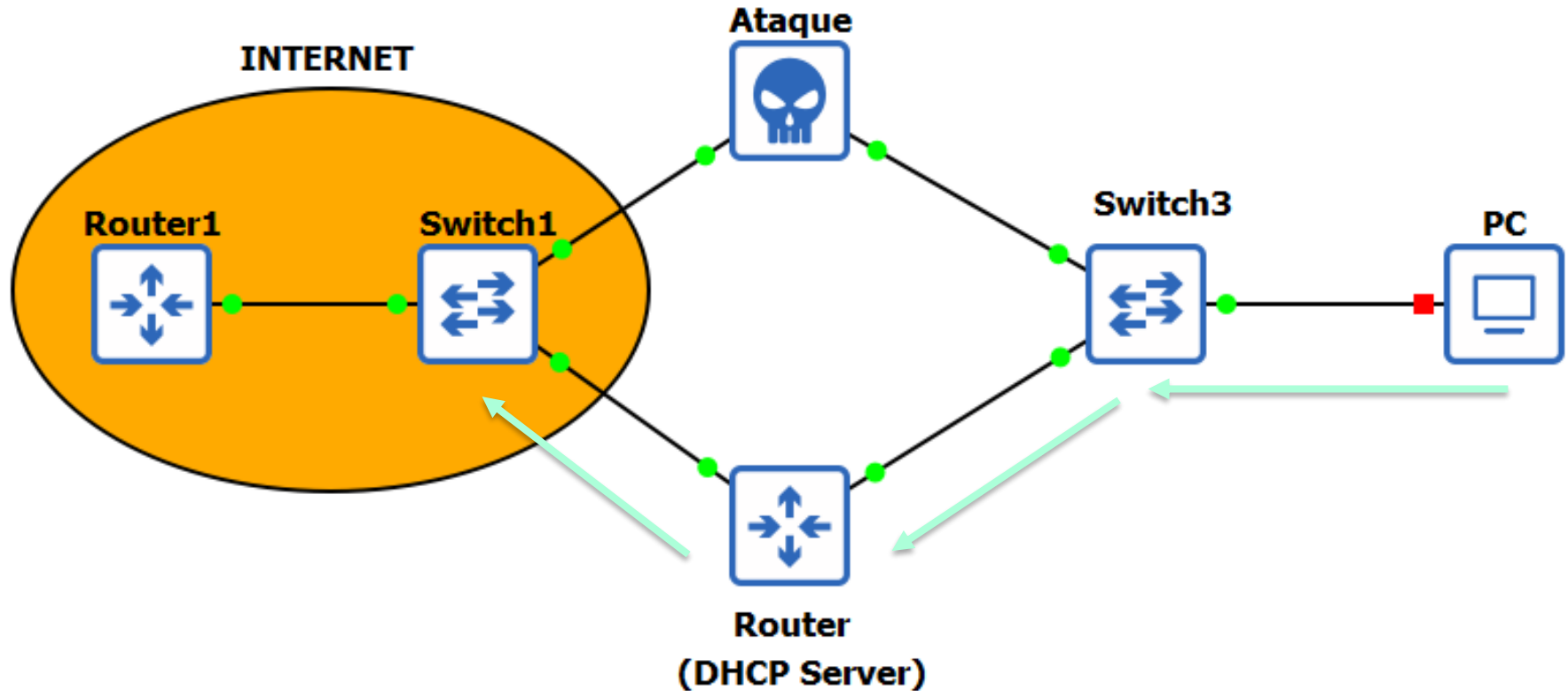
## **DHCP Spoofing Attack (DoS)**

- Ataque de negação de serviço usando grandes quantidades de solicitações de IP ao servidor
- Esgota a pool do servidor
- Isto pode levar a interrupções na conectividade de rede e causar problemas de segurança.
- Usando uma ferramenta criamos um servidor falso para oferecer IP ao cliente (MIM)

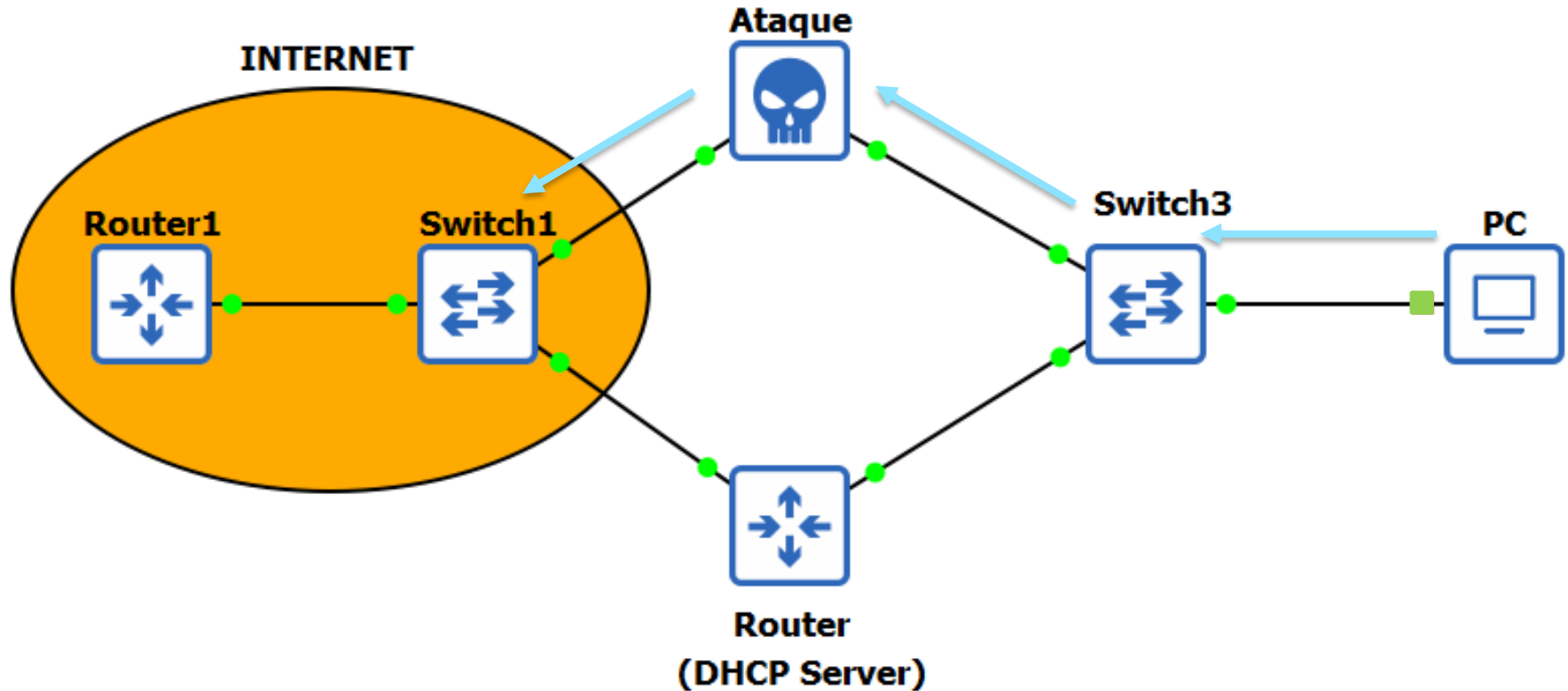
## **DHCP Spoofing Defense (DoS)**

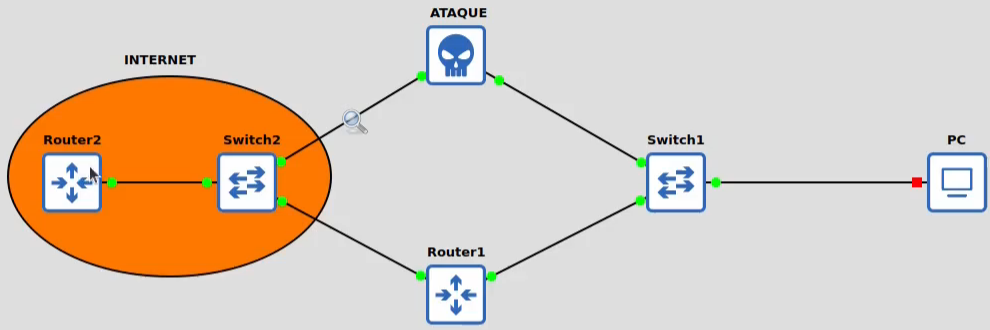
- Limitar as solicitações DHCP
- Implementar o DHCP Snooping

# DHCP Spoofing



# DHCP Spoofing





Topology Summary

- Node
  - ATAQUE
  - PC
  - Router1
  - Router2
  - Switch1
  - Switch2

Servers Summary

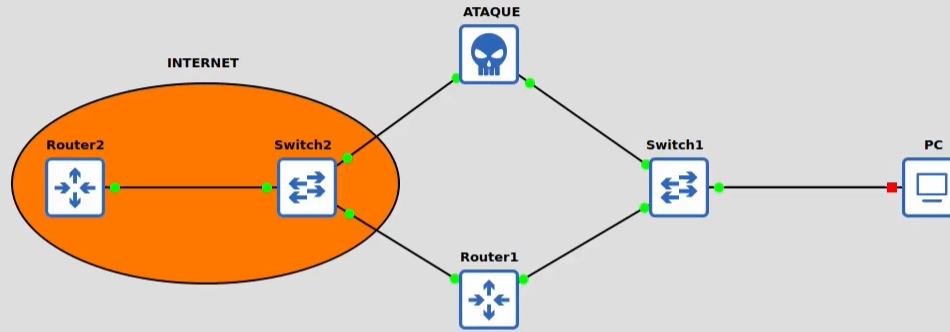
- ruben CPU 15.1%, RAM 1...

Console

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=> Invalid name detected for this node: Switch 2

File Edit View Control Node Annotate Tools Help



Topology Summary

Node

- ATAQUE
- PC
- Router1
- Router2
- Switch1
- Switch2

Servers Summary

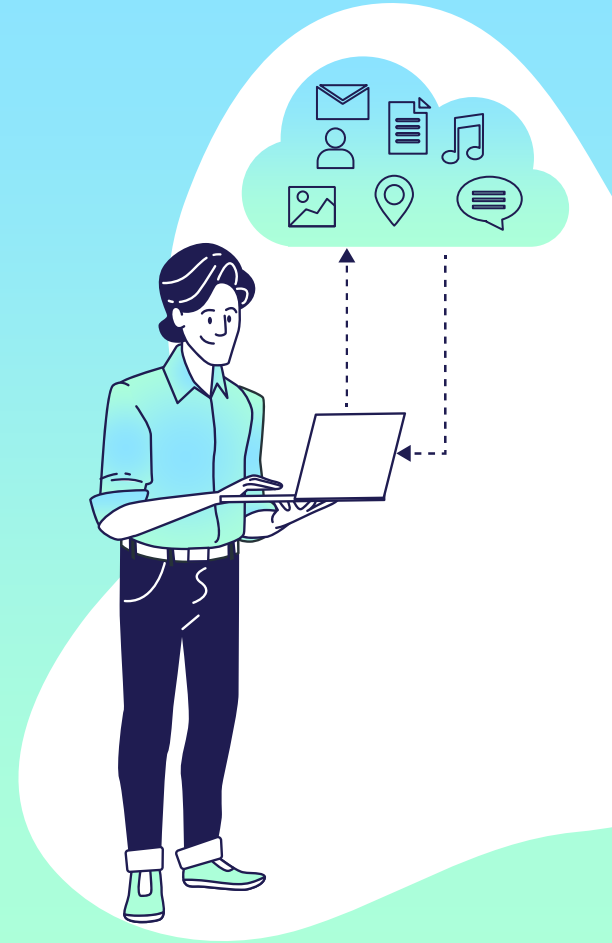
- ruben CPU 15.5%, RAM 1...

Console

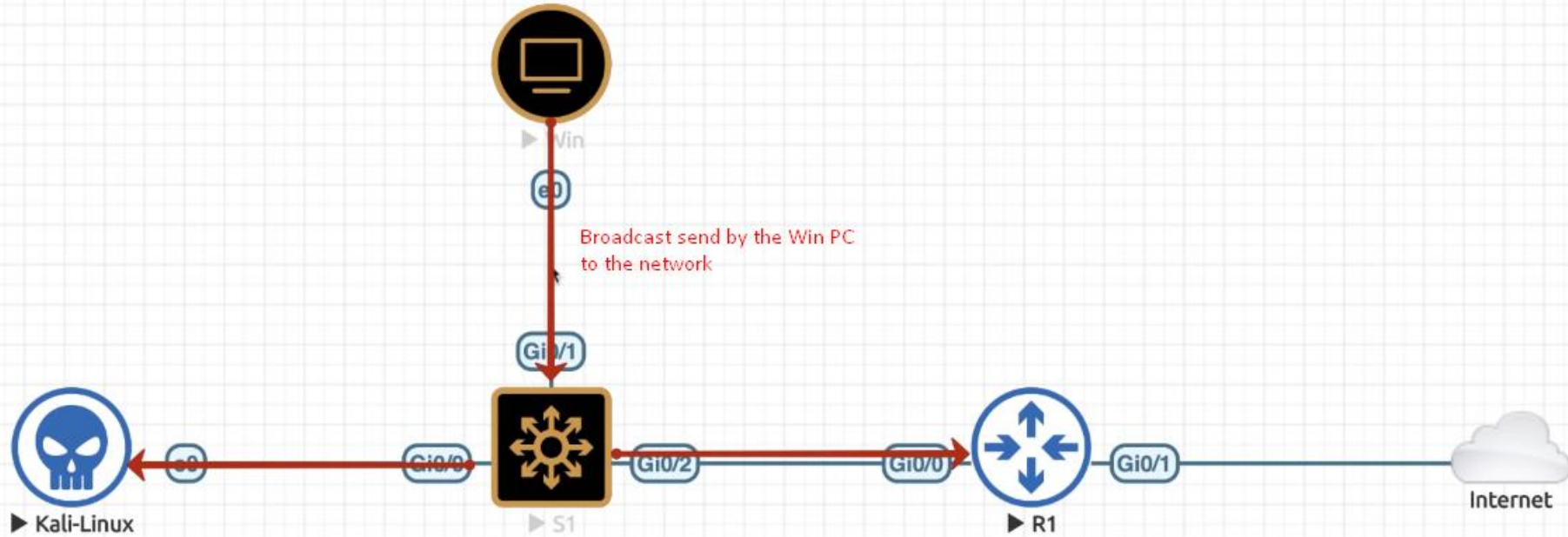
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=> Invalid name detected for this node: Switch 2

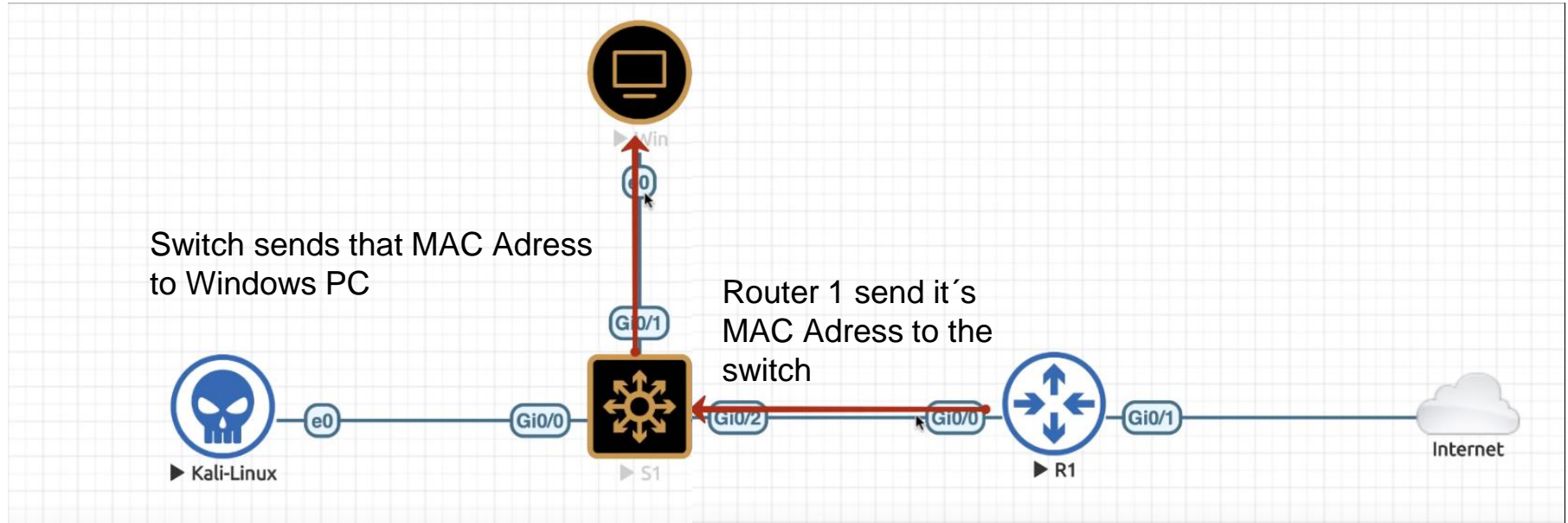
# ARP-SPOOFING



# ARP SPOOFING



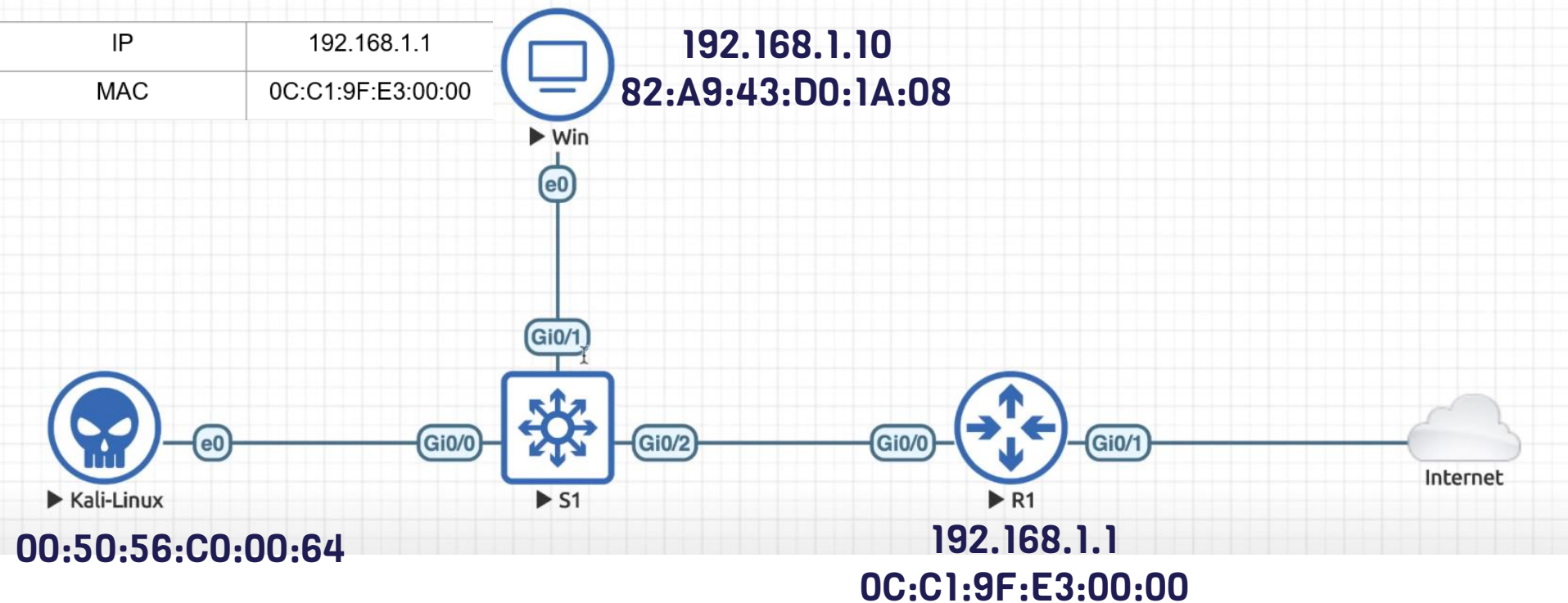
# ARP SPOOFING





# ARP SPOOFING

IP	192.168.1.1
MAC	0C:C1:9F:E3:00:00



# ARP SPOOFING ATTACK

IP	192.168.1.1
MAC	00:50:56:C0:00:64



**192.168.1.10**  
**82:A9:43:D0:1A:08**

► Win

e0

Gi0/1



► Kali-Linux

e0

Gi0/0



► S1

Gi0/2

Gi0/0



► R1

Gi0/1

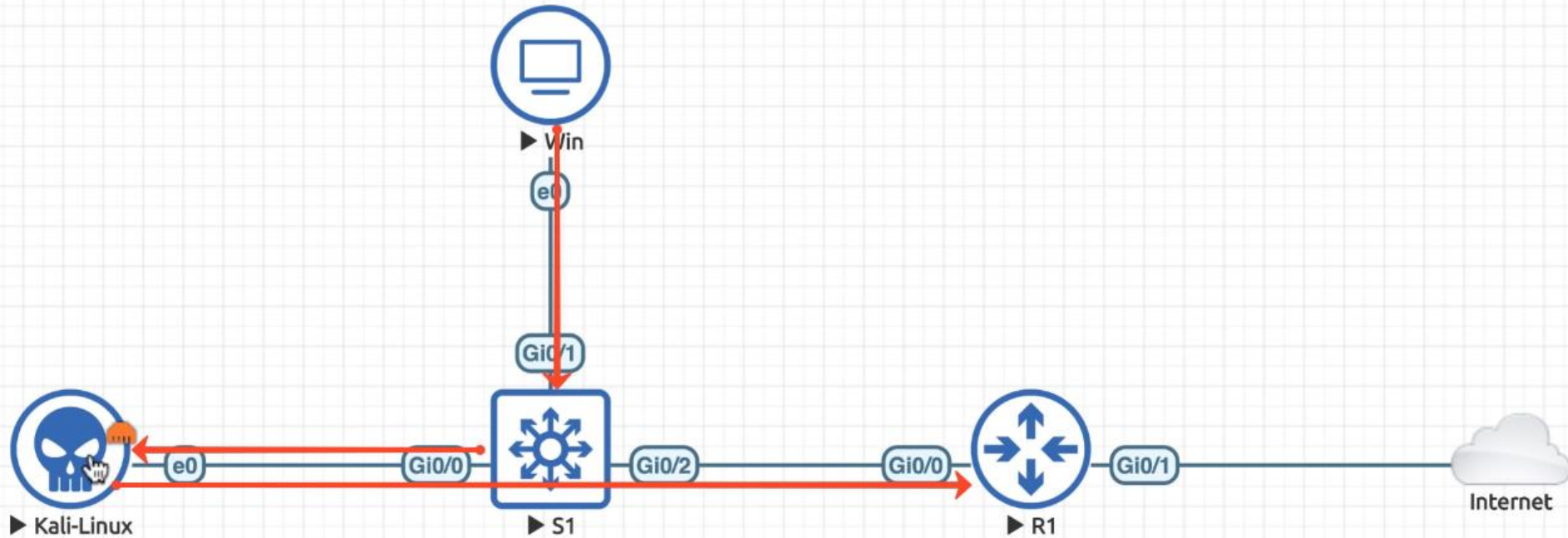


Internet

**00:50:56:C0:00:64**

**192.168.1.1**  
**0C:C1:9F:E3:00:00**

# ARP SPOOFING ATTACK



Atividades

GNS3

qua, 31 de mai 11:41:06

arp - GNS3

File

Edit

View

Control

Node

Annotate

Tools

Help

Router

Switch

PC

ATAQUE

Topology Summary

Node	Console
ATAQUE	none
PC	telnet localhost...
Router	telnet localhost...
Switch	telnet localhost...

Servers Summary

- ruben CPU 16.2%, RAM 1...

Console

GNS3 management console.  
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=>

# ARP SPOOFING Defense

- ✓ O que podemos fazer para evitar este tipo de ataques?



Atividades

GNS3

qua, 31 de mai 11:46:02

arpDefense - GNS3

File

Edit

View

Control

Node

Annotate

Tools

Help

Router

Switch

PC

ATAQUE

Topology Summary

Node	Console
ATAQUE	none
PC	telnet localhost...
Router	telnet localhost...
Switch	telnet localhost...

Servers Summary

ruben	CPU 14.5%, RAM 1...
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Console

GNS3 management console.  
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=>

# Conclusão

