Podemos confiar na Internet?

Hermano Pereira

Professor – Tecnologia em Sistemas para Internet

UTFPR - Câmpus Guarapuava

Fórum Técnico

CELEPAR
Guarapuava

08 de outubro de 2014

Agenda

Introdução

1 – Confiar na Resolução de Domínios?

2 – Confiar no Roteamento de Provedores?

3 – Confiar em Autoridades Certificadoras?

Considerações Finais

aproximadamente 70 minutos

Introdução

Segurança

- Integridade
- Disponibilidade
- Confidencialidade

Introdução

1 – Resolução de Domínios

2 – Roteamento de Provedores

3 – Autoridades Certificadoras

→ *blog Sandro Suffert*

→ *atuação na área*

UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ

1 -

Podemos confiar na Resolução de Domínios?

1 – Confiar na Resolução de Domínios?

- DNS – Domain Name System

  Documento RFC 1034 (1987)

1 – Confiar na Resolução de Domínios?

Internauta

1 – Confiar na Resolução de Domínios?

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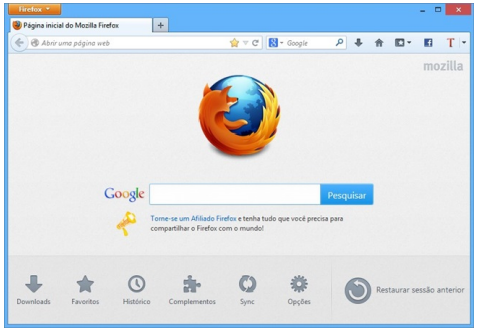

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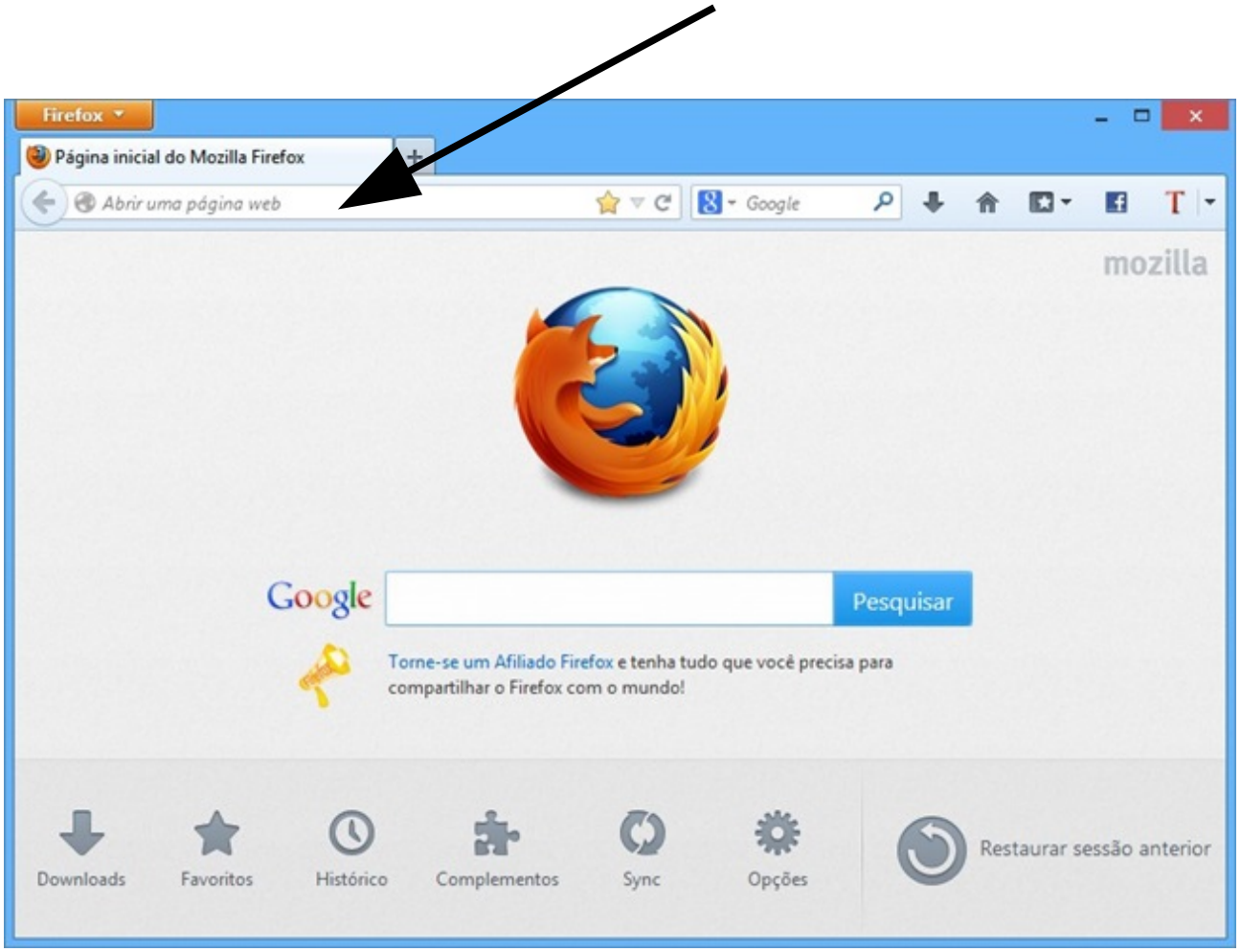

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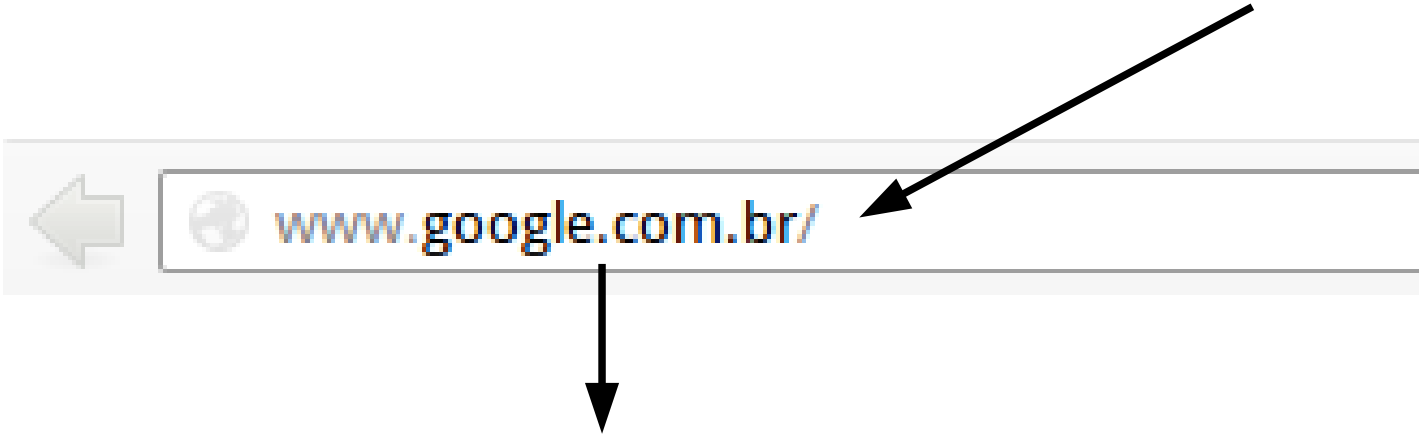

Domínio

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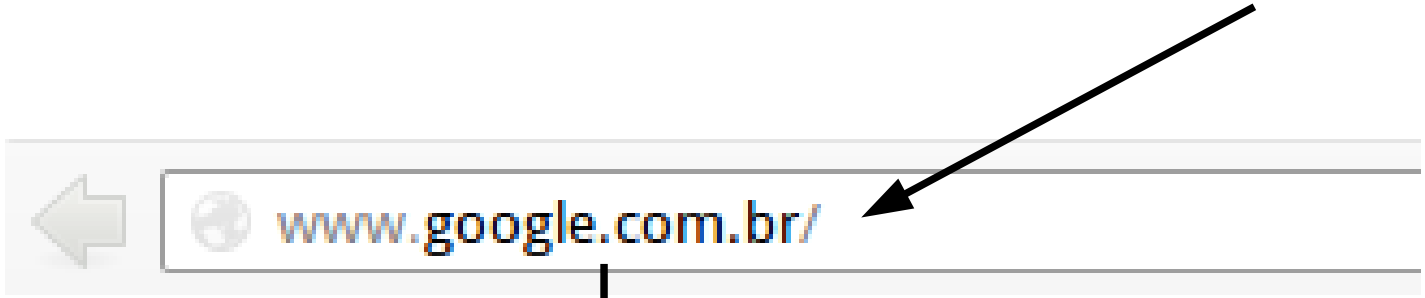

Domínio

Endereço IP

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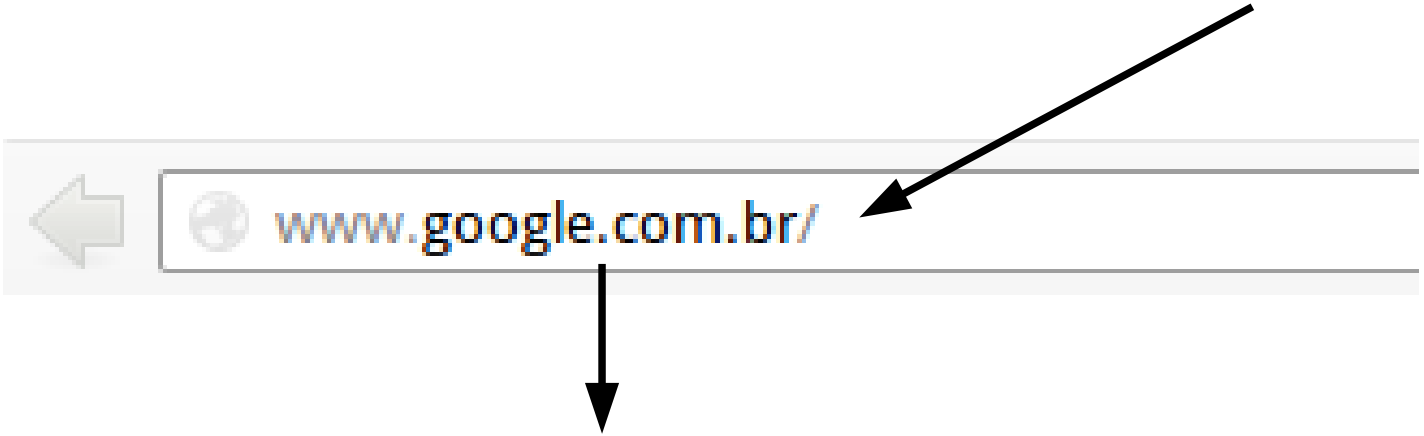


Domínio

Endereço IP

74.125.234.23

1 – Confiar na Resolução de Domínios?

Resolver o domínio

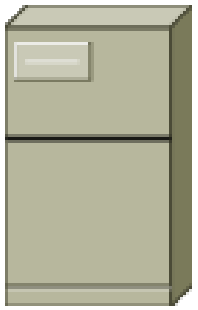
www.google.com.br

Para o endereço IP

74.125.234.23

1 – Confiar na Resolução de Domínios?

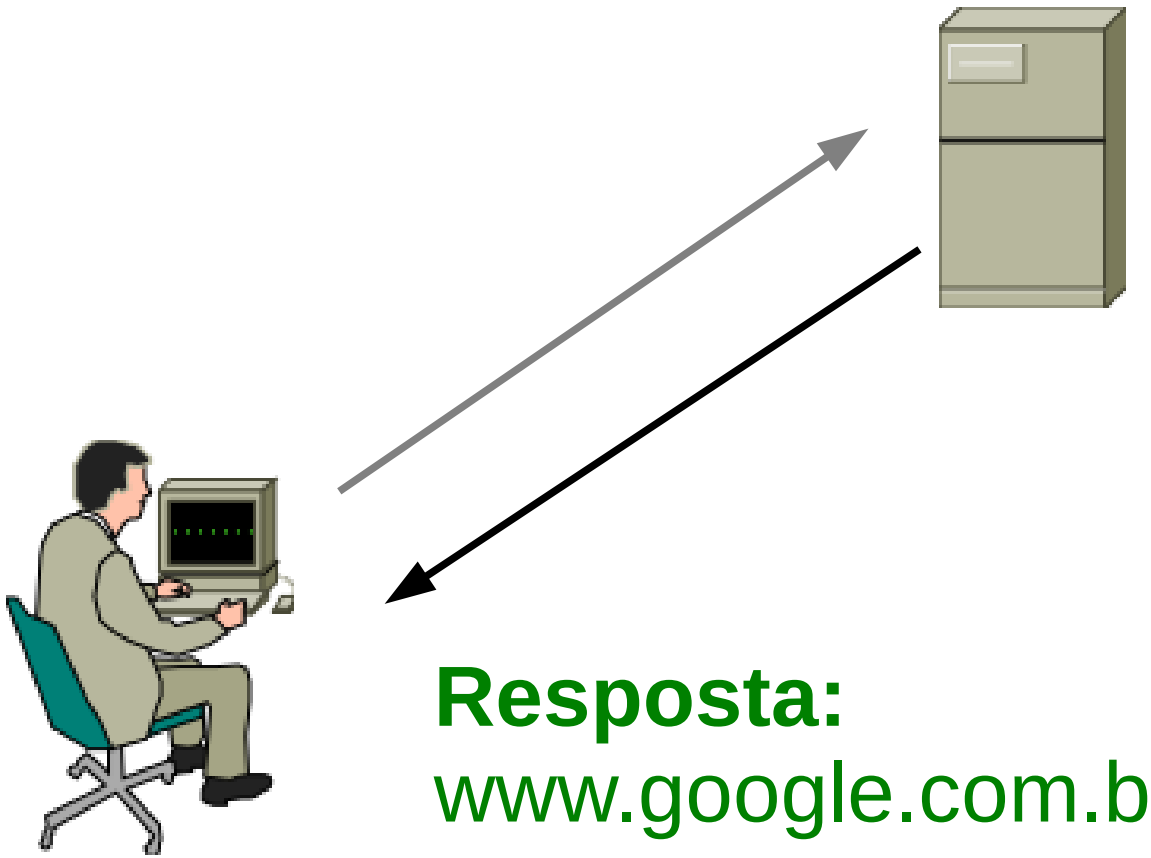
Servidor DNS



Pergunta:
Endereço IP de www.google.com.br?

1 – Confiar na Resolução de Domínios?

Servidor DNS



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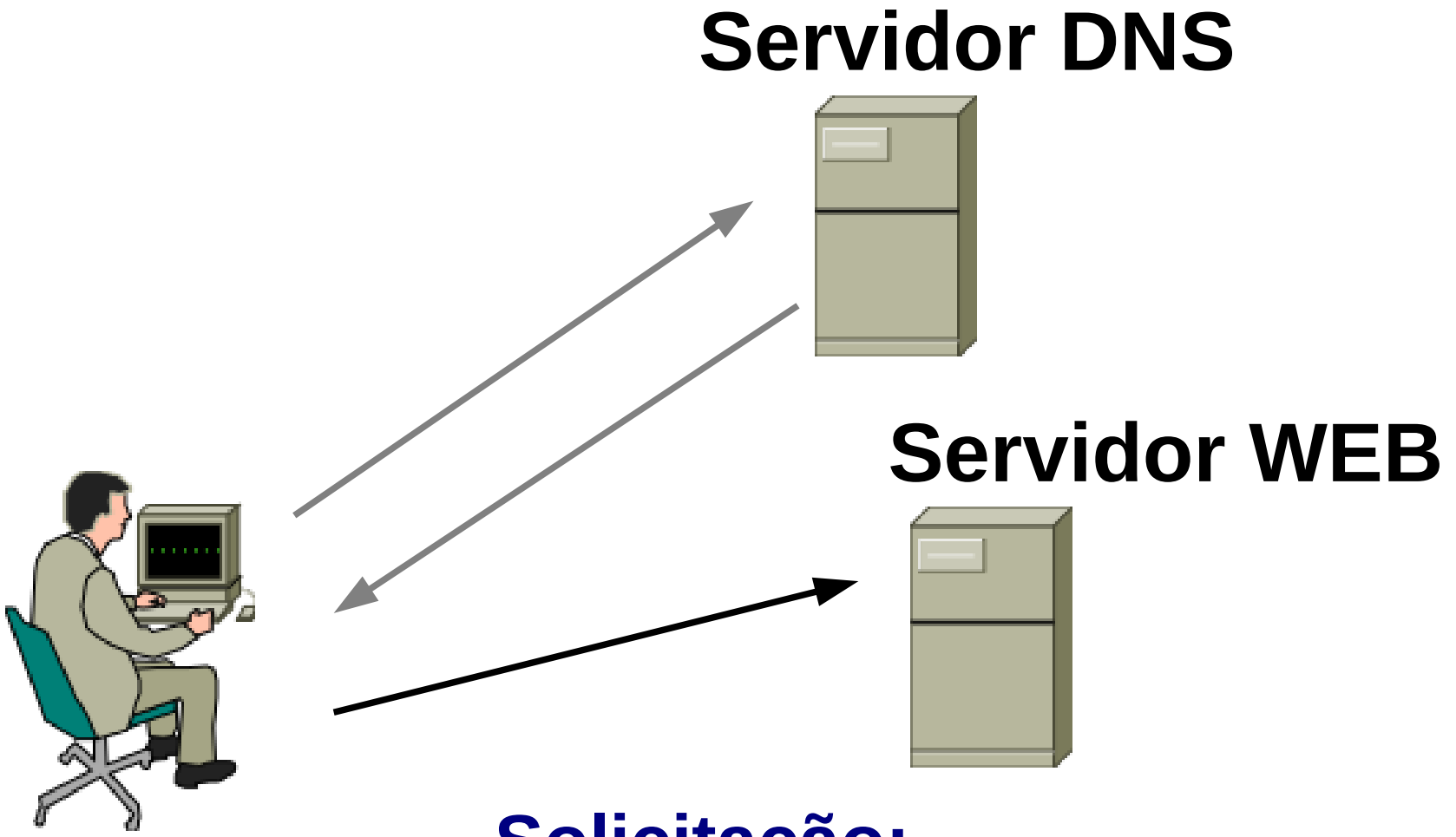

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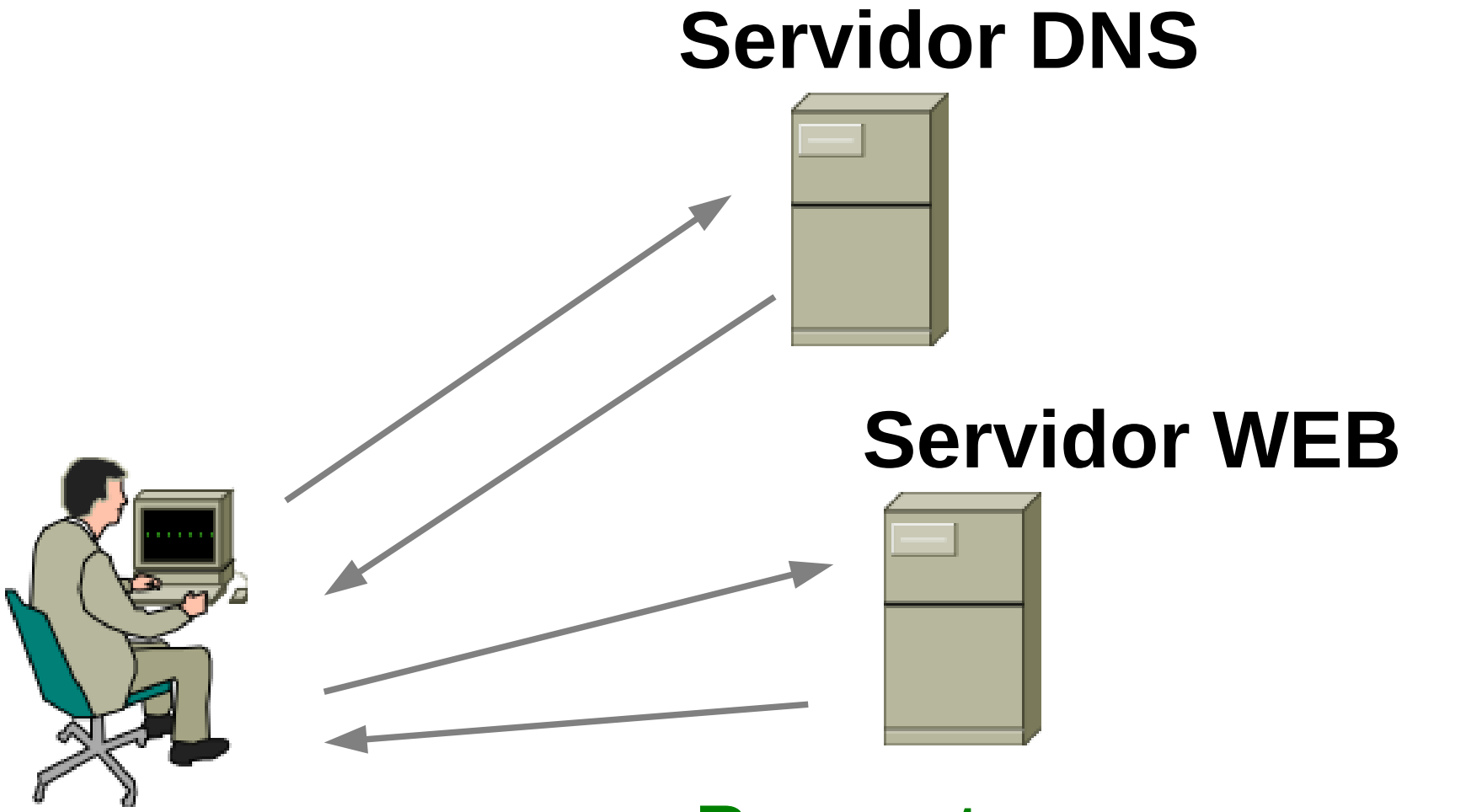


1 – Confiar na Resolução de Domínios?

Google Brasil

Pesquisa Google Estou com sorte

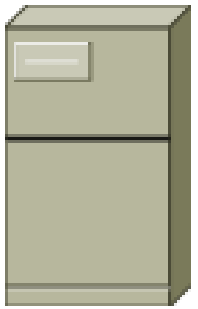
1 – Confiar na Resolução de Domínios?

Internauta

Servidor DNS

PERGUNTA

RESPOSTA



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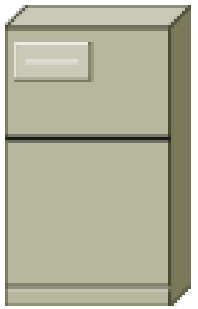

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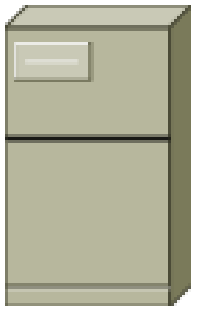

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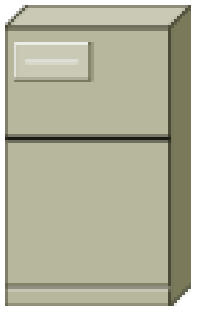

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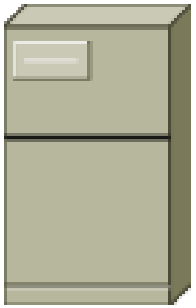

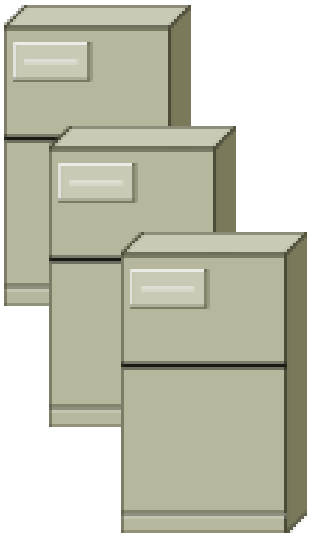

Servidores DNS

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Servidor DNS

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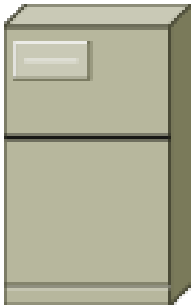

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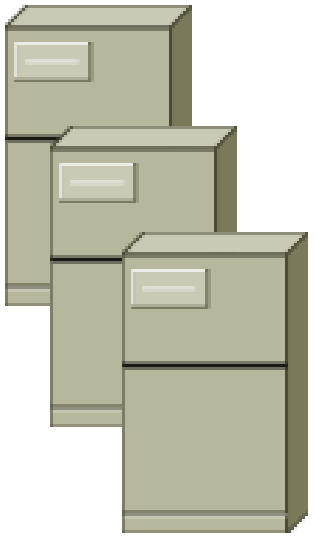

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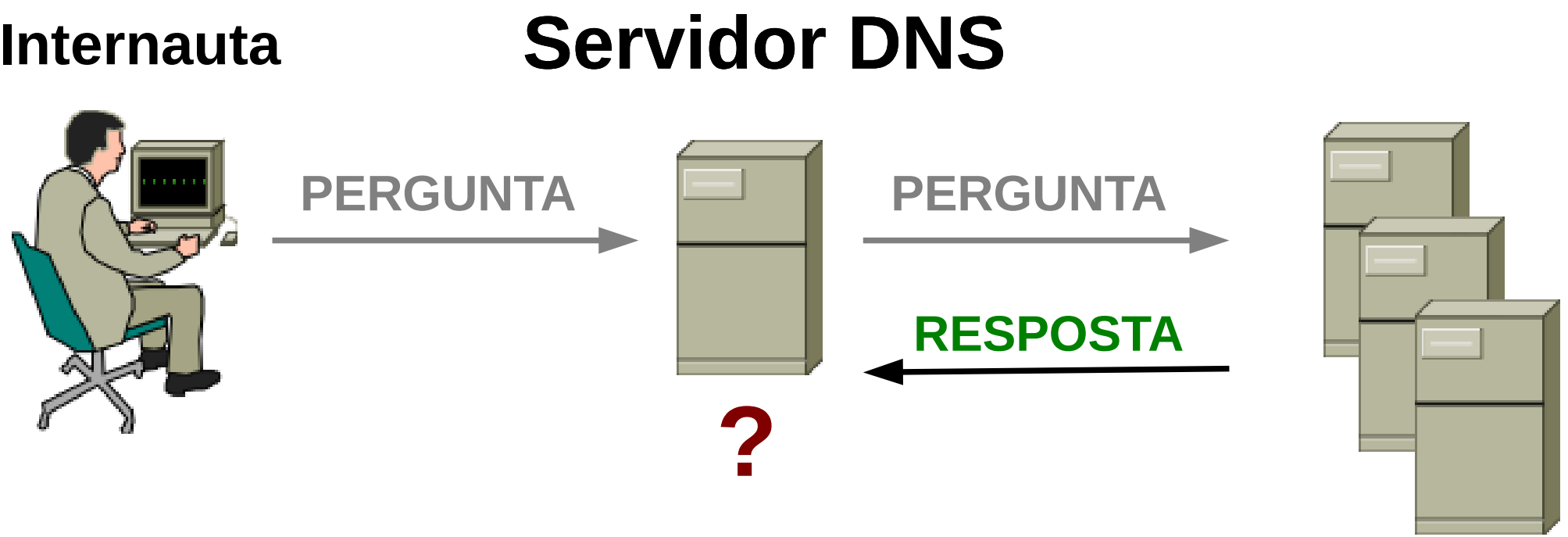

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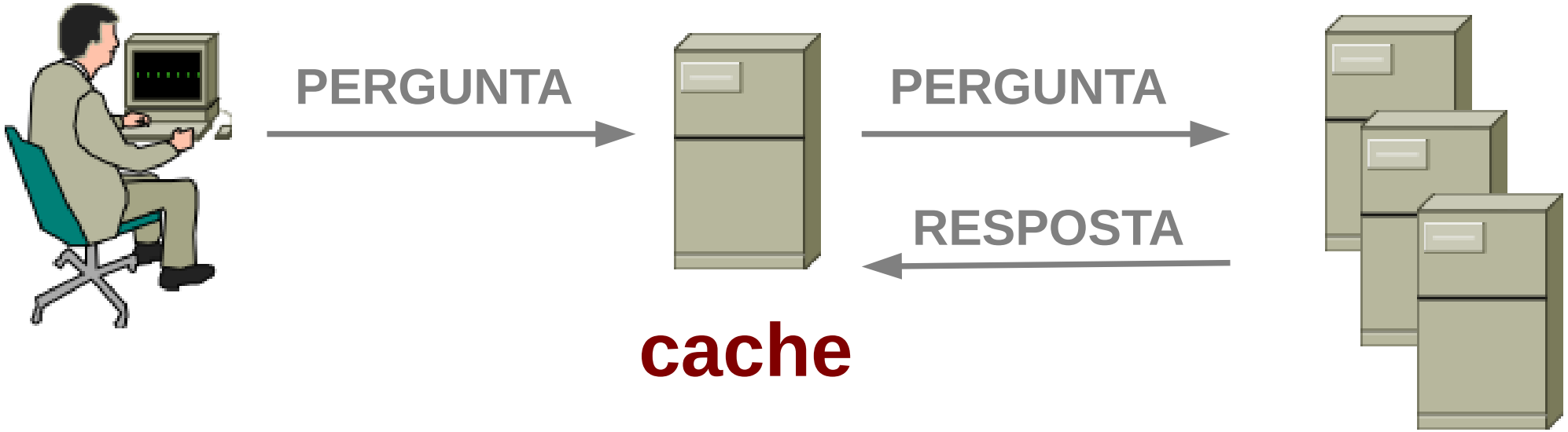

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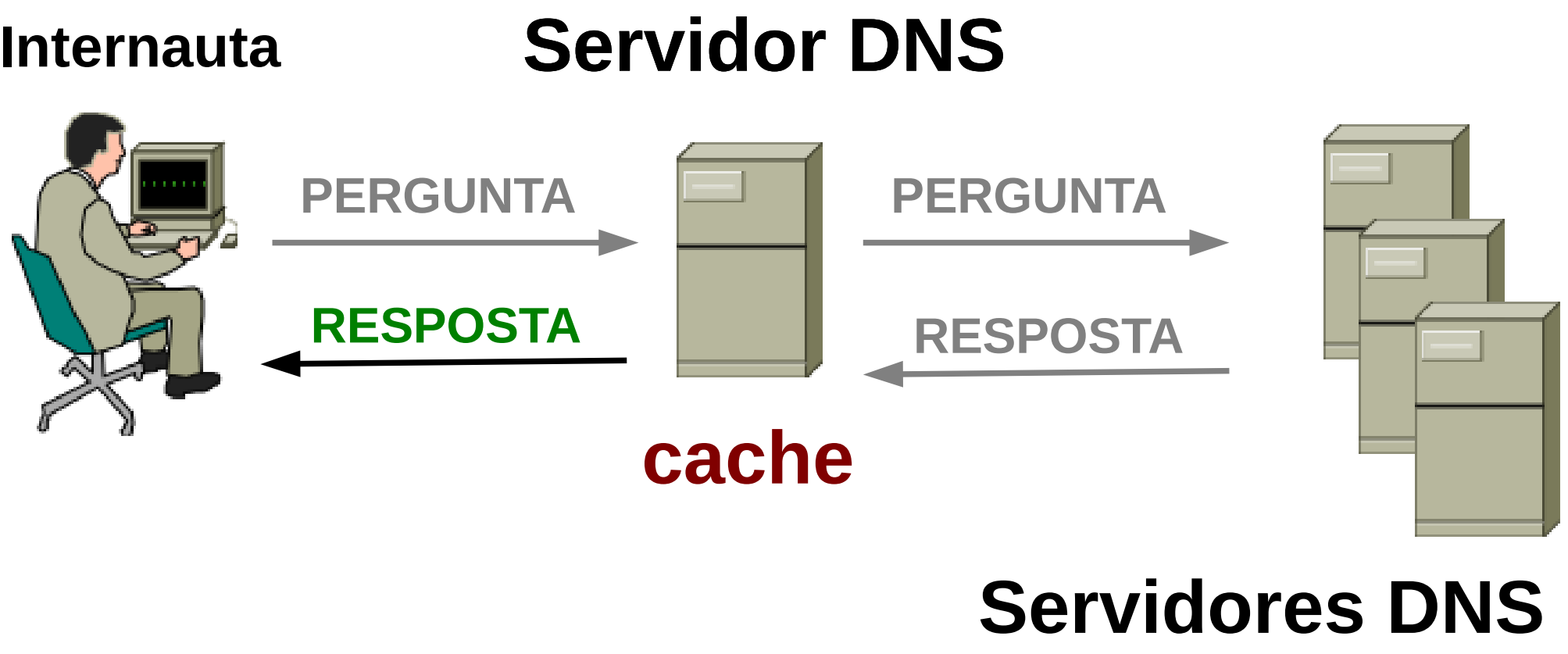

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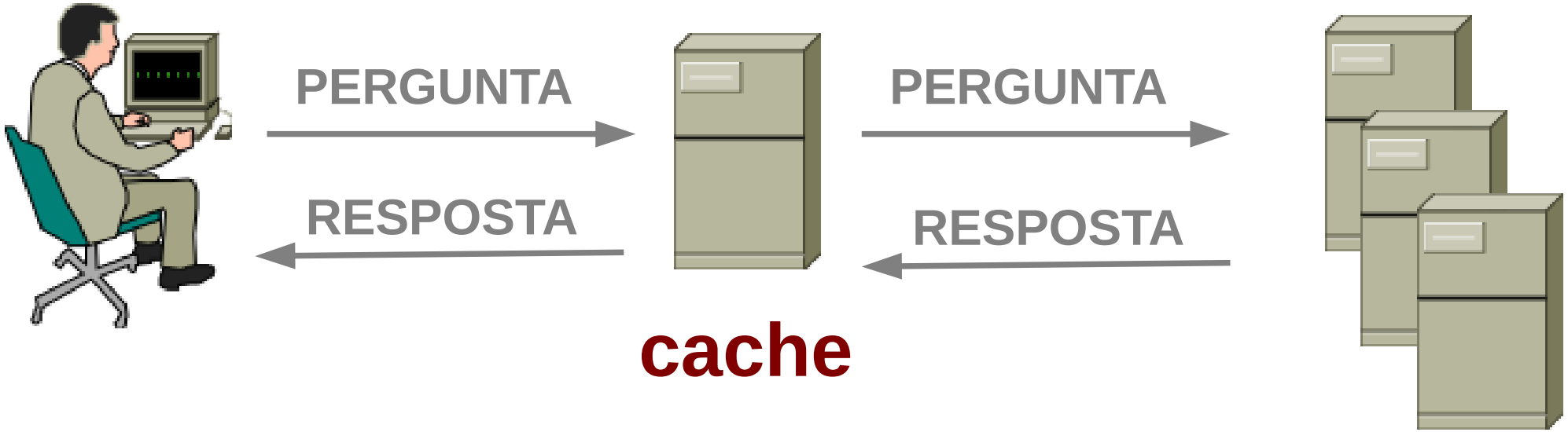

Servidores DNS

1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

CVE-2008-1447
DNS Cache Poisoning

Dan Kaminsky

→ Servidores DNSs Vulneráveis

→ Windows

→ Unix/Linux

→ Dispositivos de redes

1 – Confiar na Resolução de Domínios?

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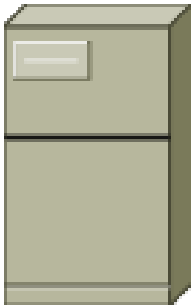
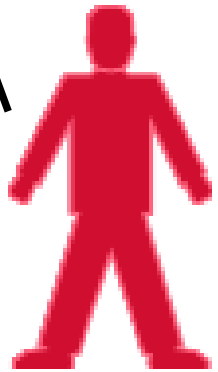
Servidor DNS



PERGUNTAS



Atacante

1 – Confiar na Resolução de Domínios?

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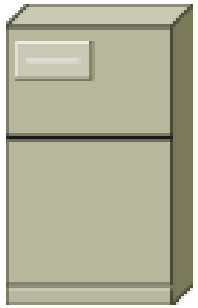
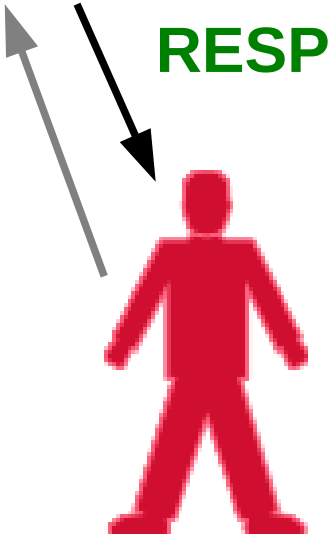
Servidor DNS



RESPOSTAS



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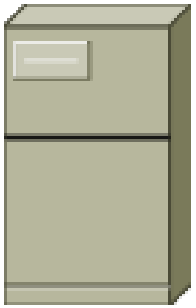

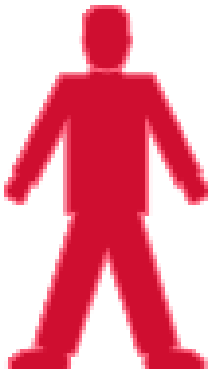

Atacante

INFORMAÇÕES
- Porta
- ID

1 – Confiar na Resolução de Domínios?

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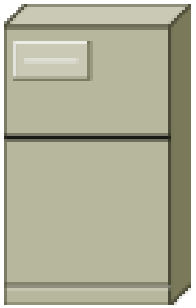

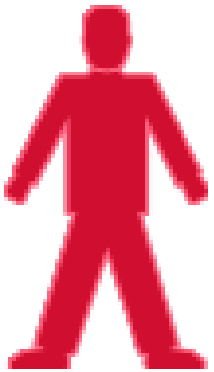

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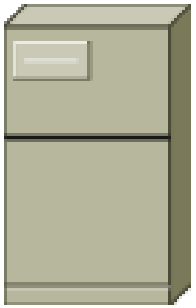

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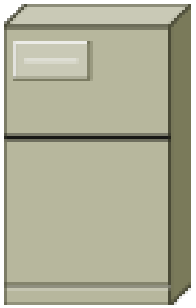

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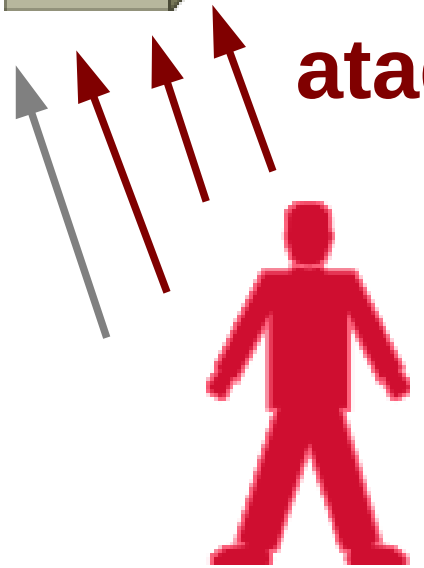

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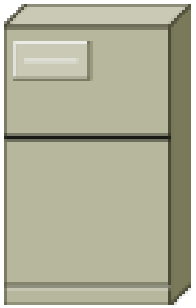

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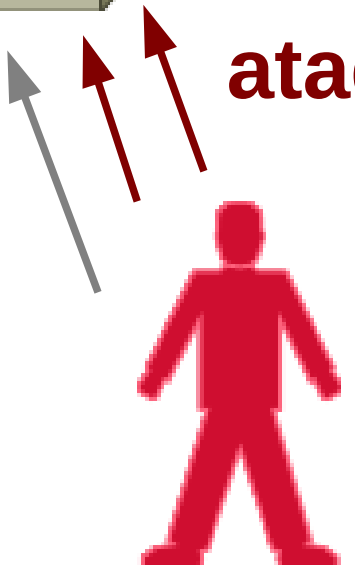

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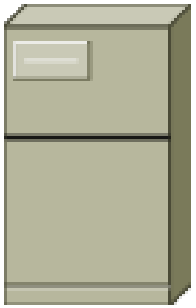

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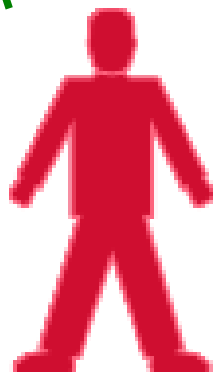

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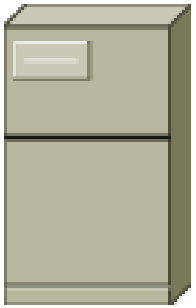

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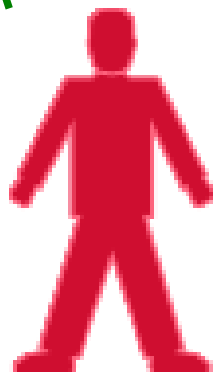

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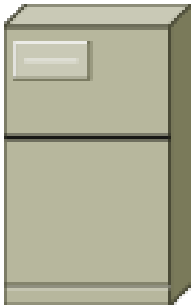

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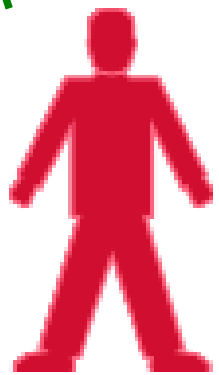

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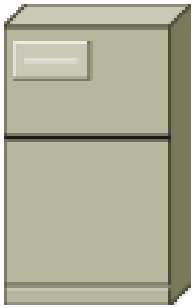

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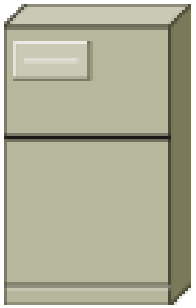

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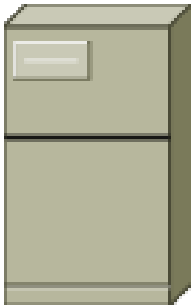

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Internauta

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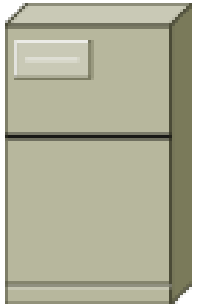
Servidor Web Banco



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Servidor Web Atacante

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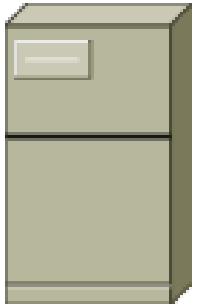
Acessar 166.66.66.6

Servidor Web Banco



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Acessar 166.66.66.6

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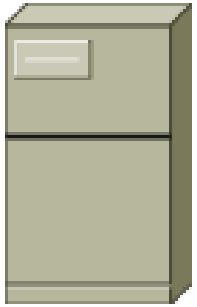

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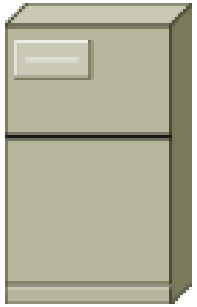
Acessar 166.66.66.6

Servidor Web Banco



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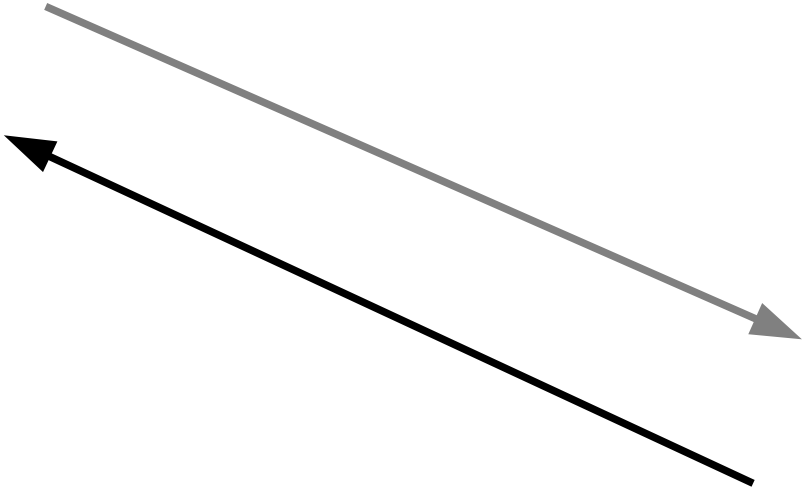


Servidor Web Atacante

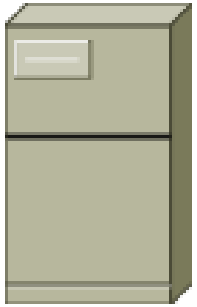
166.66.66.6

1 – Confiar na Resolução de Domínios?

Internauta

Acessar 166.66.66.6

Servidor Web Banco



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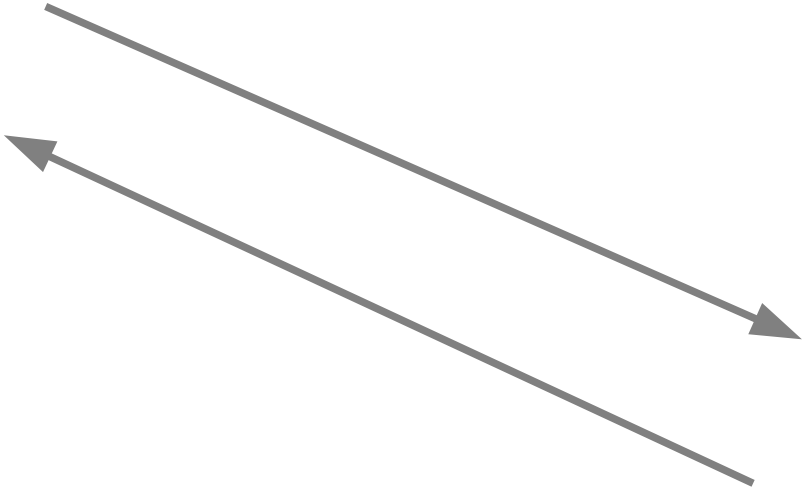

Servidor Web Atacante

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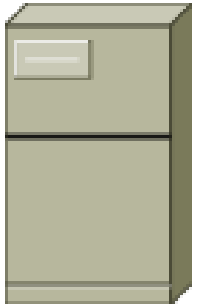
1 – Confiar na Resolução de Domínios?

Internauta

Acessar 166.66.66.6

Servidor Web Banco



123.31.123.31

Servidor Web Atacante

166.66.66.6

1 – Confiar na Resolução de Domínios?

Incidente de Segurança – Abril/2009

DNS - Provedor (Net)

WEB - Banco (Brad)

Site hospedado na Ásia usado para roubar senhas e credenciais.

1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

Incidentes de Segurança

Malawi (domínios .mw)
Fev/2013

Kenya (domínios .ke)
Abril/2013

Provavelmente DNS Poison

1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

Incidentes de Segurança

Malawi (domínios .mw)
Fev/2013

Kenya (domínios .ke)
Abril/2013

Provavelmente DNS Poison

1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

China - Jan/2014

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SECURITY

DNS poisoning slams web traffic from millions in China into the wrong hole

ISP blames unspecified attack for morning outage

By John Leyden, 21 Jan 2014 Follow 2,990 followers

8

Linux and AIX Bare-Metal Recovery Webinar

A widespread DNS outage hit China on Tuesday, leaving millions of surfers adrift.

RELATED

DNS issues in China between 7am and 9am GMT left millions of domains

1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

Malaisia – Out/2013 (google.com.my)

Google Malaysia hit by DNS poisoning (Updated)

1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

Solução:

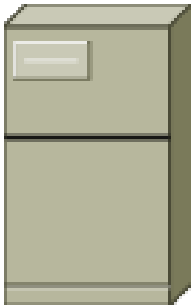
Paliativa
- antes (possibilidade 1 em 65535)
- depois (possibilidade 1 em 134 mi)

1 – Confiar na Resolução de Domínios?

Internauta

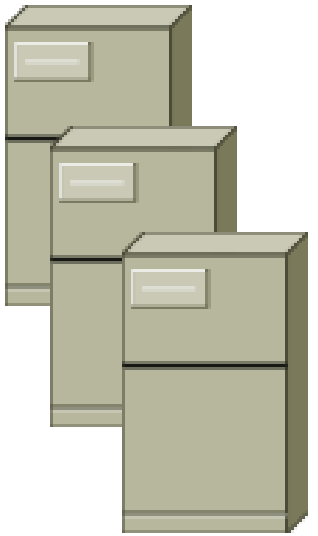
Servidor DNS

PERGUNTA



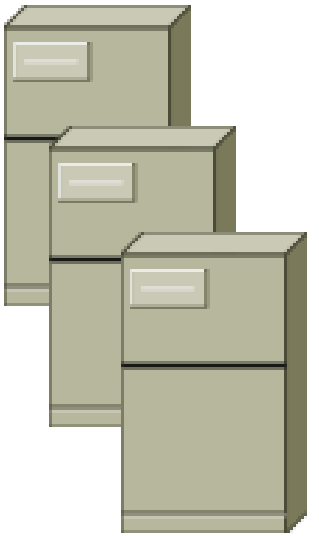
?

PERGUNTA



Servidores DNS

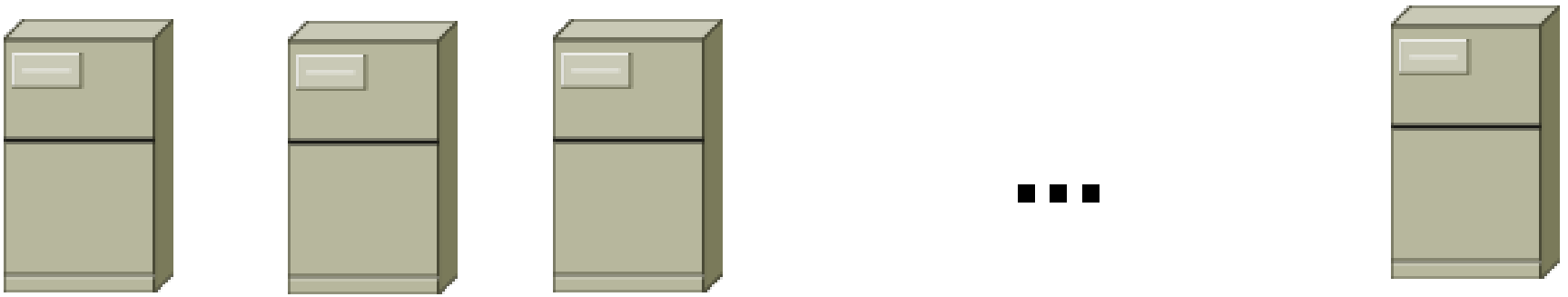
1 – Confiar na Resolução de Domínios?



Servidores DNS

1 – Confiar na Resolução de Domínios?

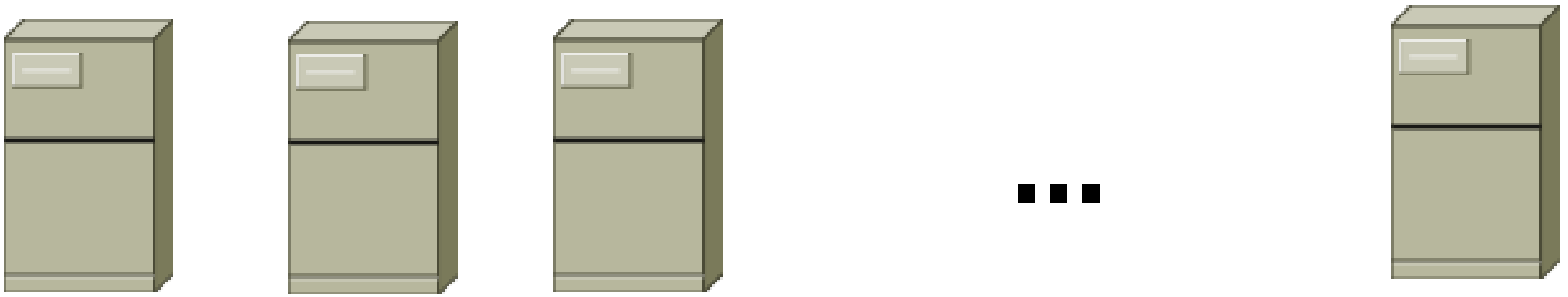
Servidores de DNS Raiz



A B C ... M

1 – Confiar na Resolução de Domínios?

Servidores de DNS Raiz



A **B** **C** **M**

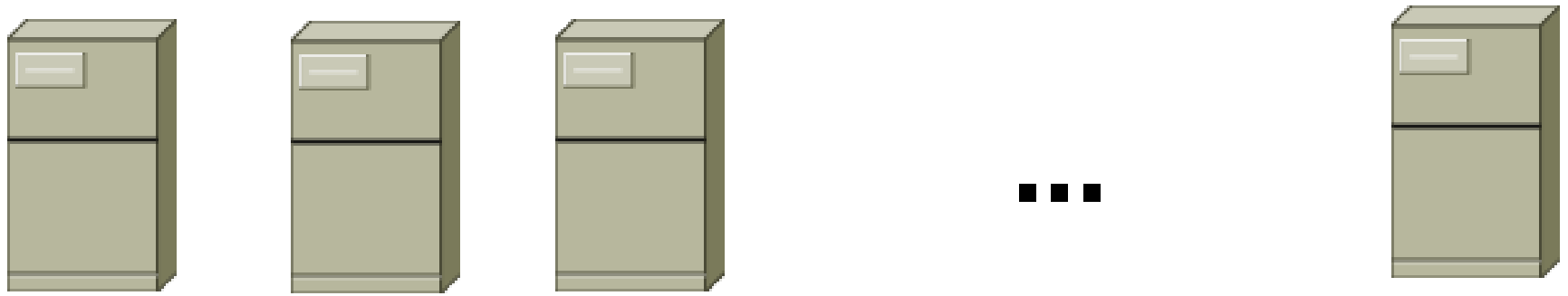
Maior parte nos EUA e na Europa

Domínios TLD → .com, .net, .org, .us, .br ...

1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

Servidores de DNS Raiz

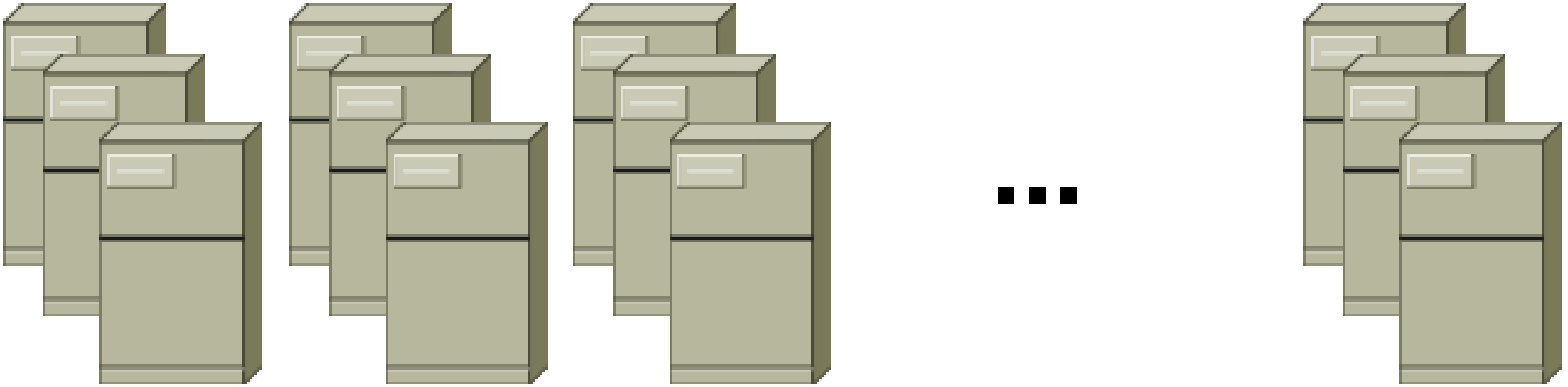


...

A B C

Réplicas pelo Mundo

M



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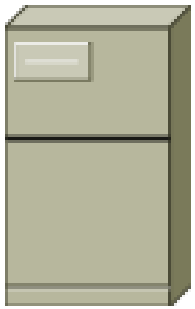
1 – Confiar na Resolução de Domínios?

Incidente de Segurança



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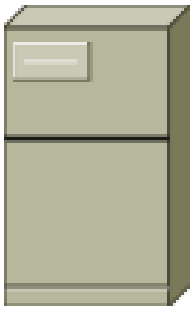
SUÉCIA



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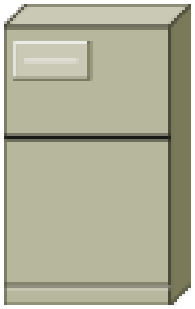

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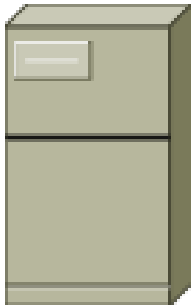

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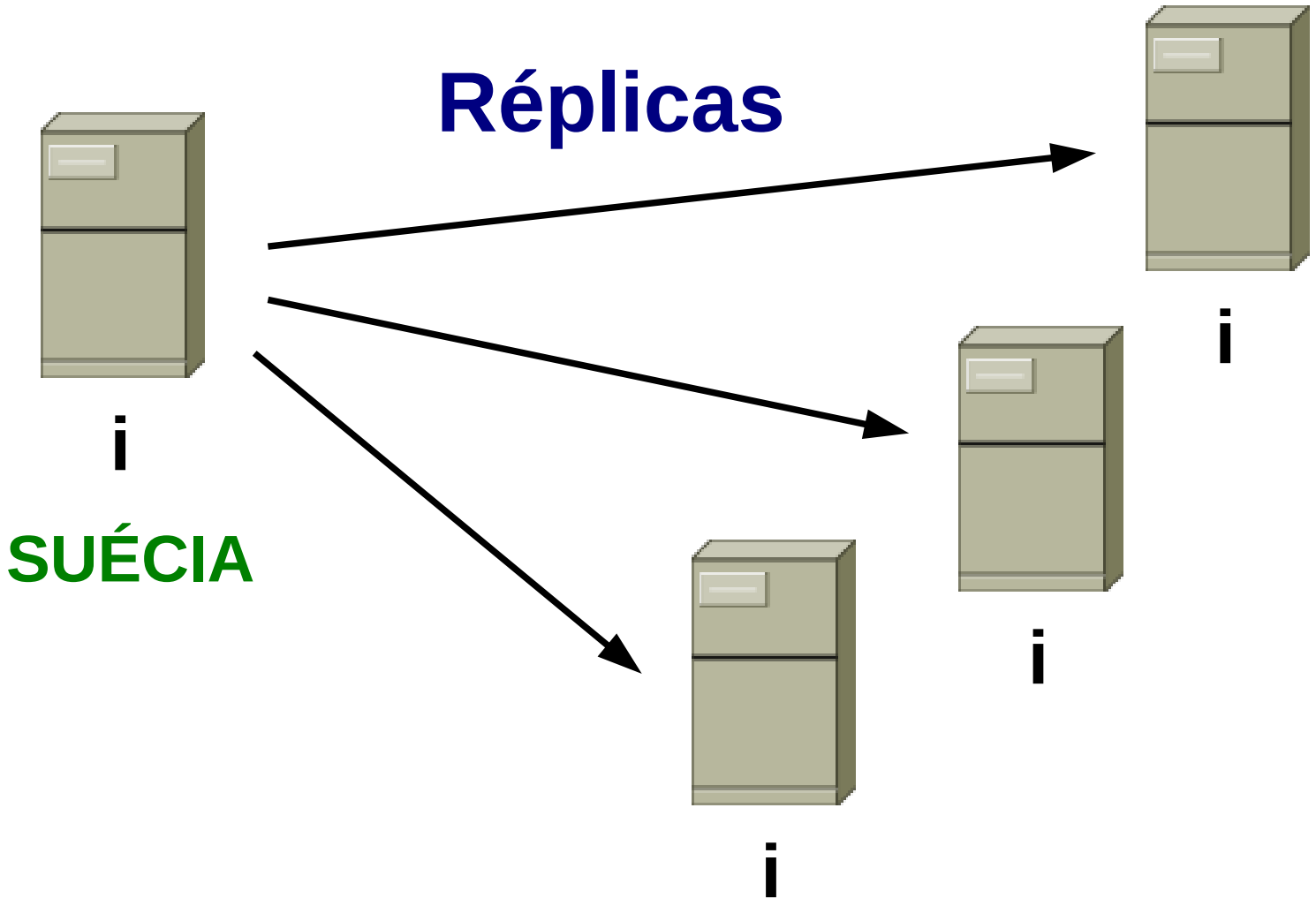
1 – Confiar na Resolução de Domínios?

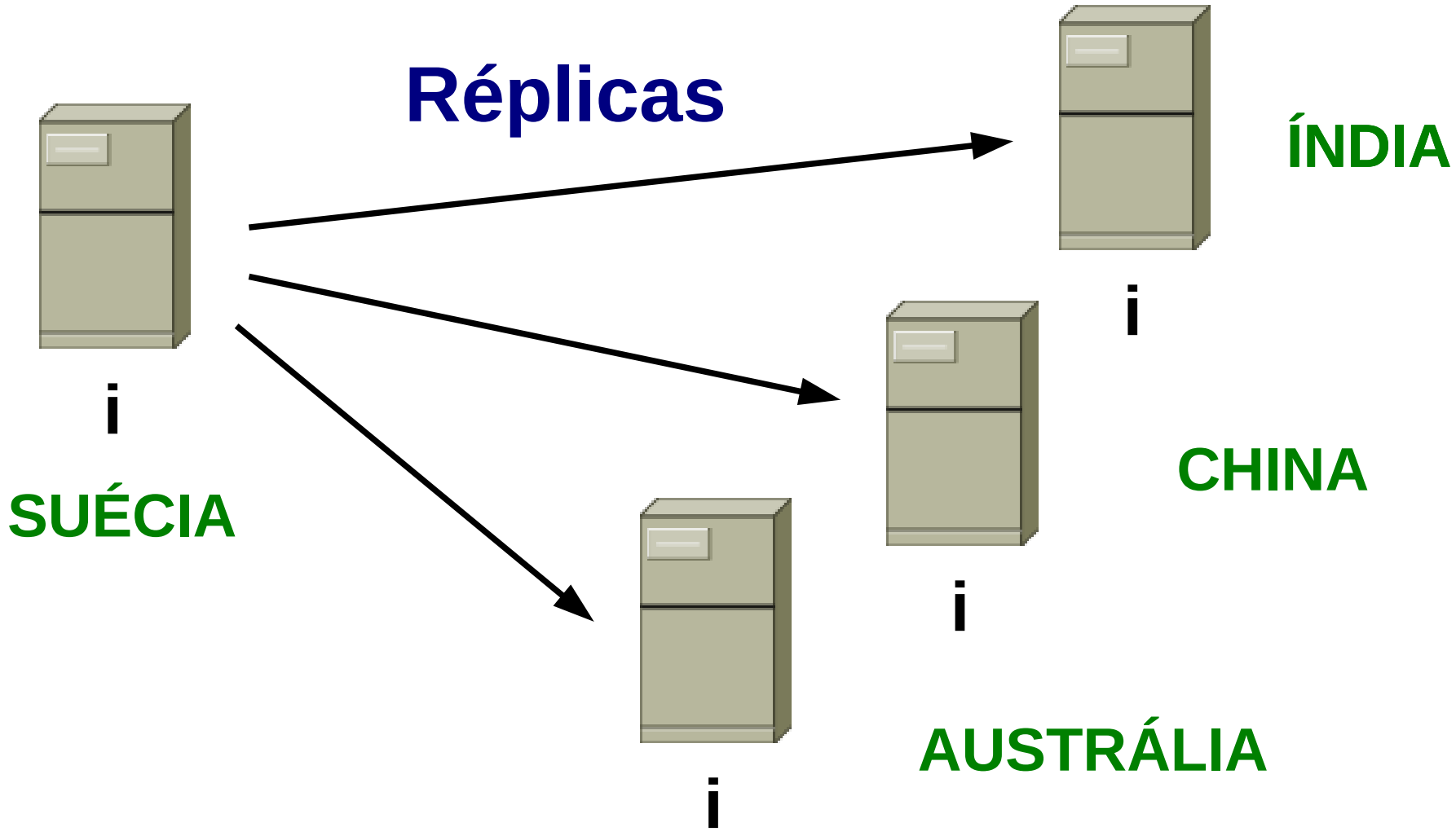
Incidente de Segurança



1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

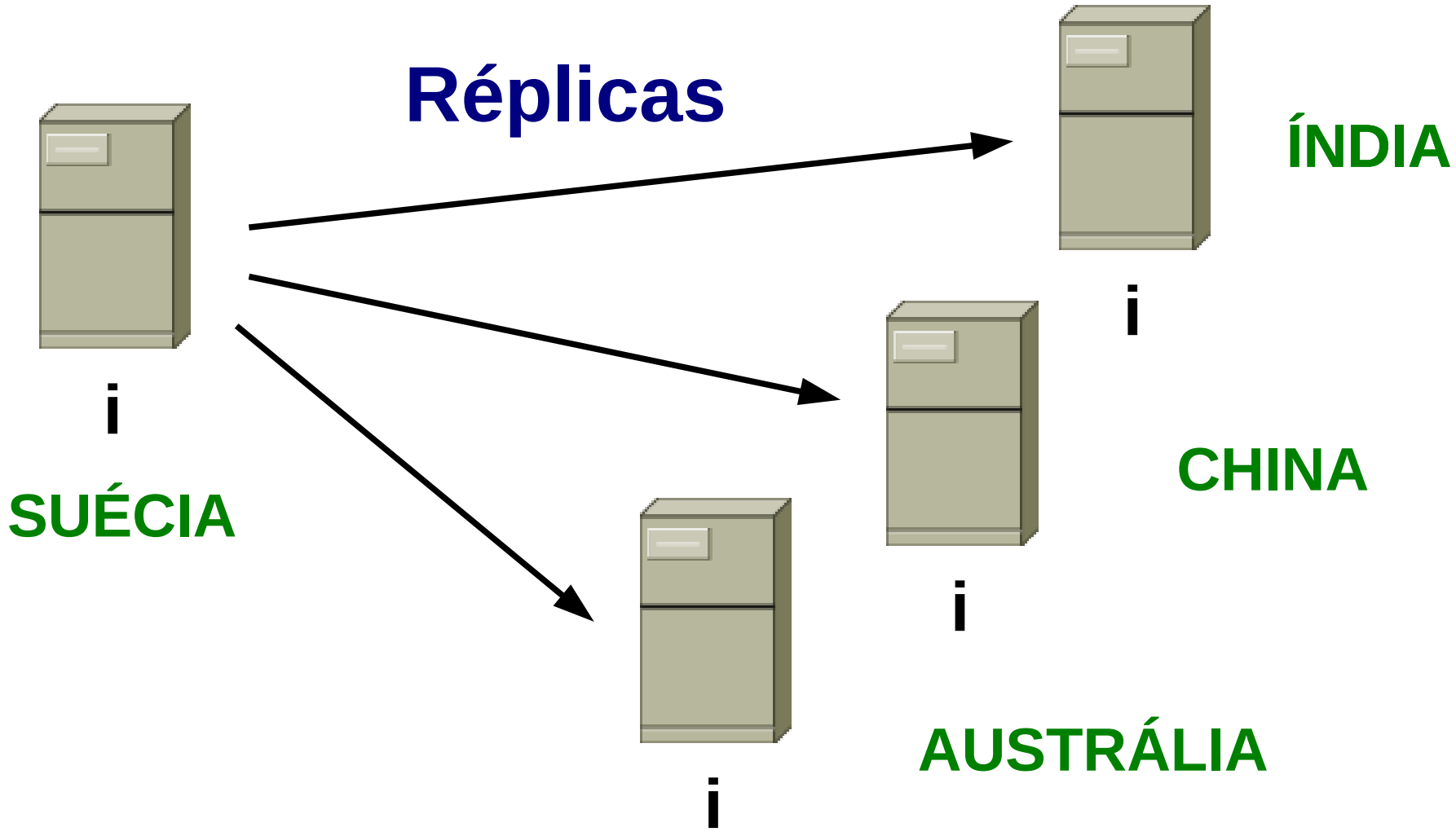
Incidente de Segurança



1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

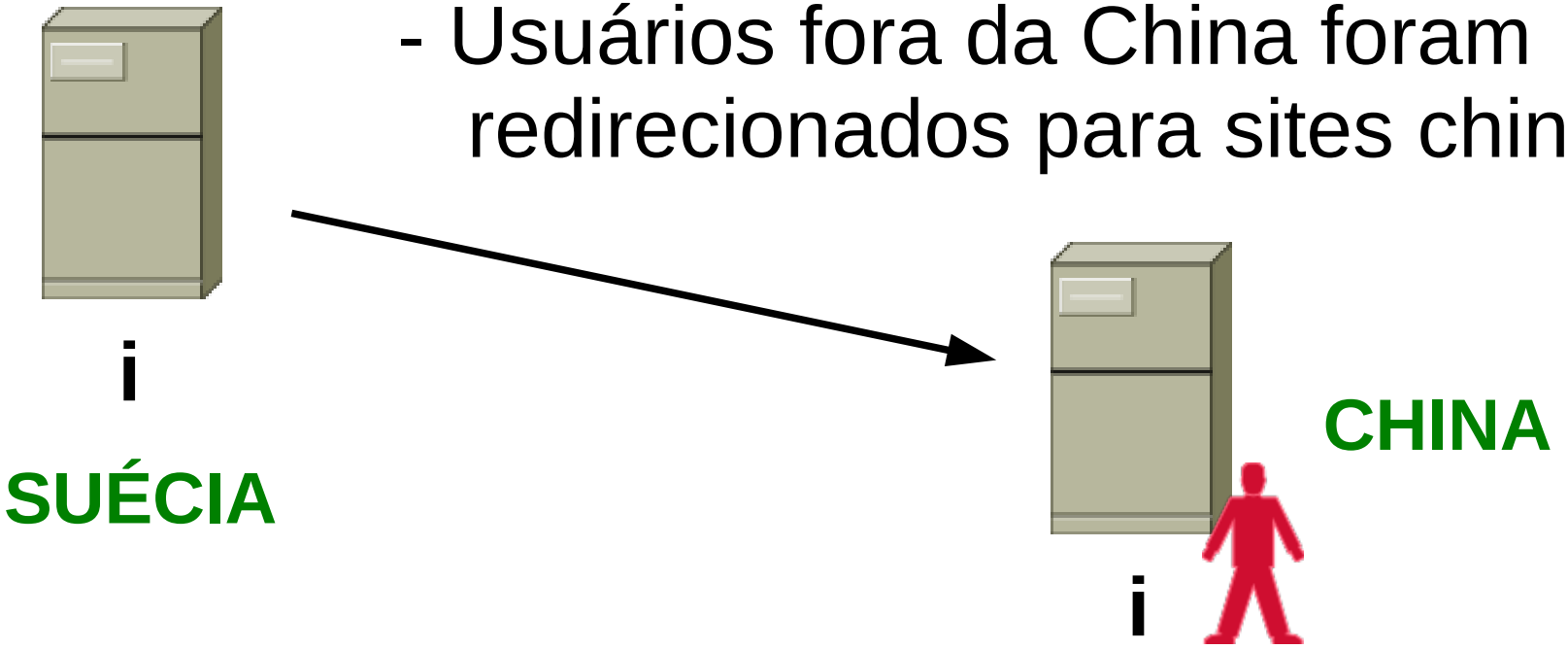
Incidente de Segurança



1 – Confiar na Resolução de Domínios?

Incidente de Segurança

Em março de 2010
- Usuários fora da China foram redirecionados para sites chineses.



- Sites como Facebook, Twitter, Youtube...

1 – Confiar na Resolução de Domínios?

NETWORKING

PCWorld

BUSINESS READY

After DNS Problem, Chinese Root Server Is Shut Down

By Robert McMillan, IDG News Service

Mar 26, 2010 5:10 PM

1 – Confiar na Resolução de Domínios?

CELEPAR INFORMÁTICA do PARANÁ

Solução:

- Empresa Sueca cortou servidor raiz chinês

- Hoje poderia utilizar DNSSEC (DNS Seguro) ?!?

UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ

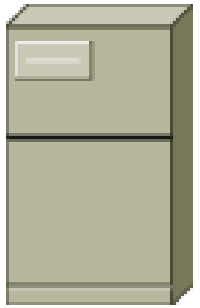
2 -

Podemos confiar no Roteamento de Provedores?

2 – Confiar no Roteamento Provedores?

Internauta

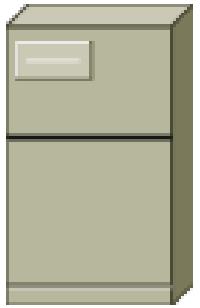
Servidor Web



2 – Confiar no Roteamento Provedores?

Internauta

Servidor Web

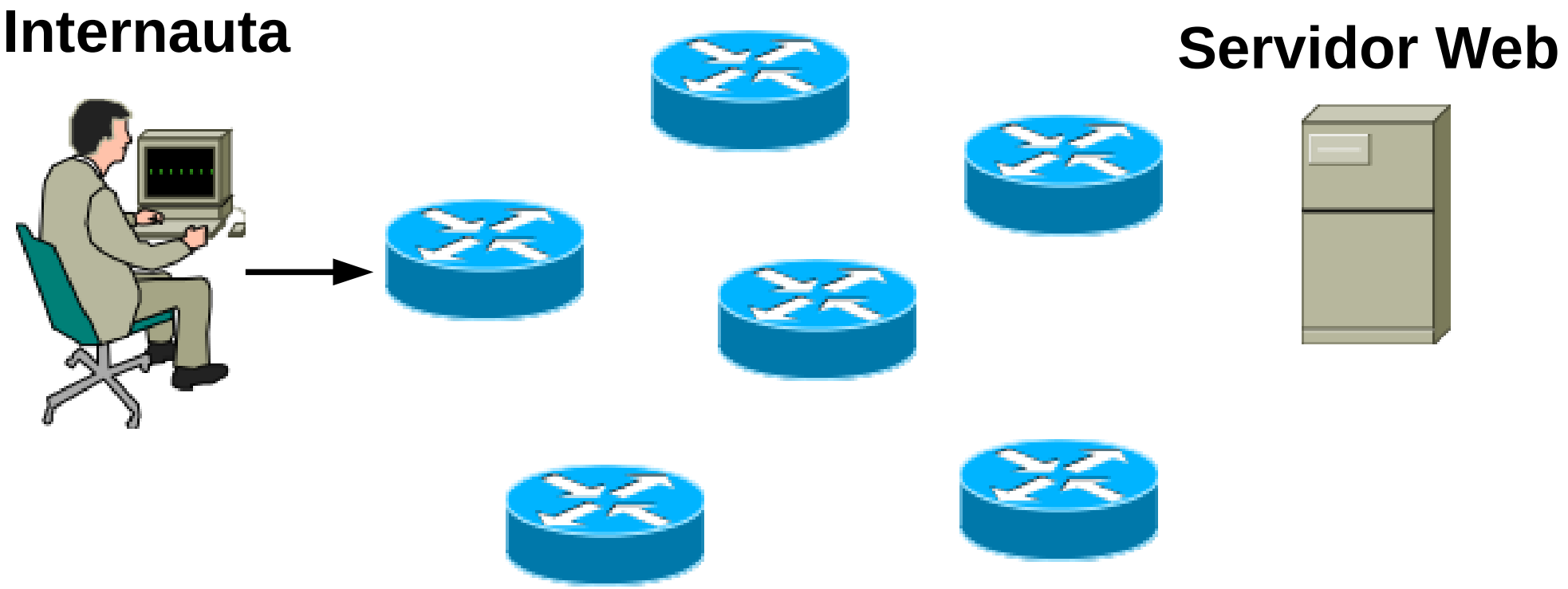


Internet Protocol

1981

Documento RFC 781

2 – Confiar no Roteamento Provedores?



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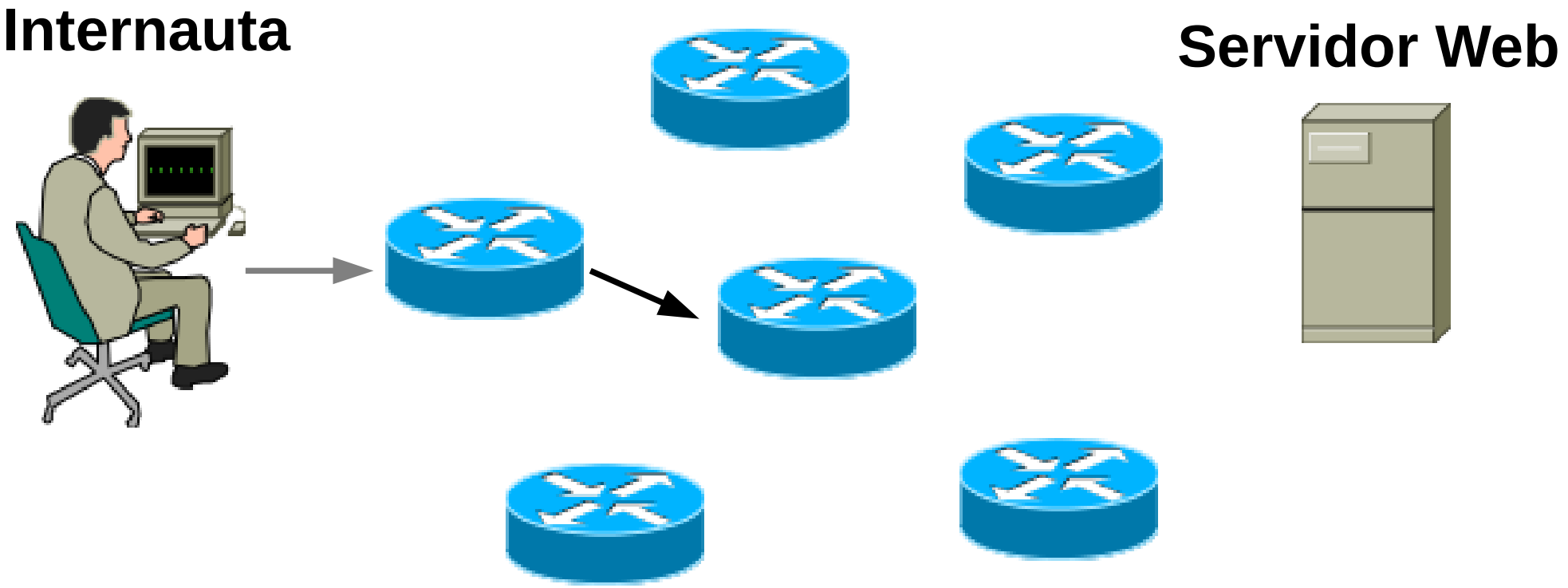

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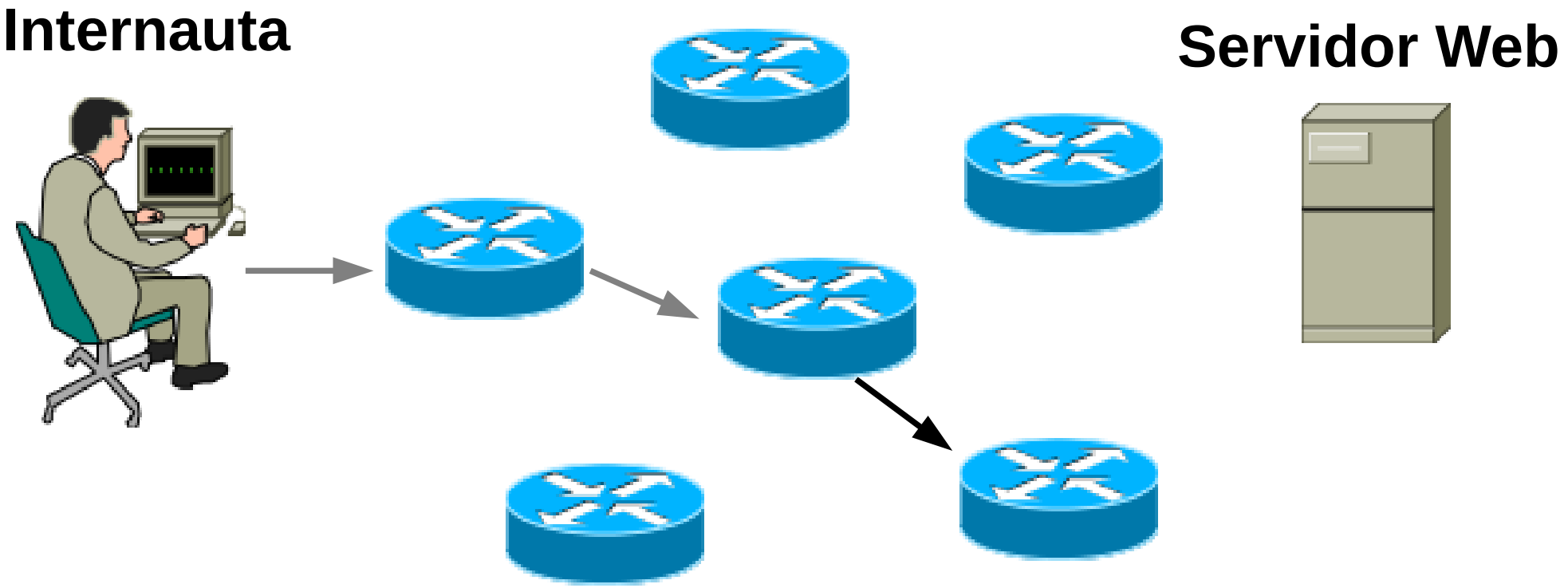

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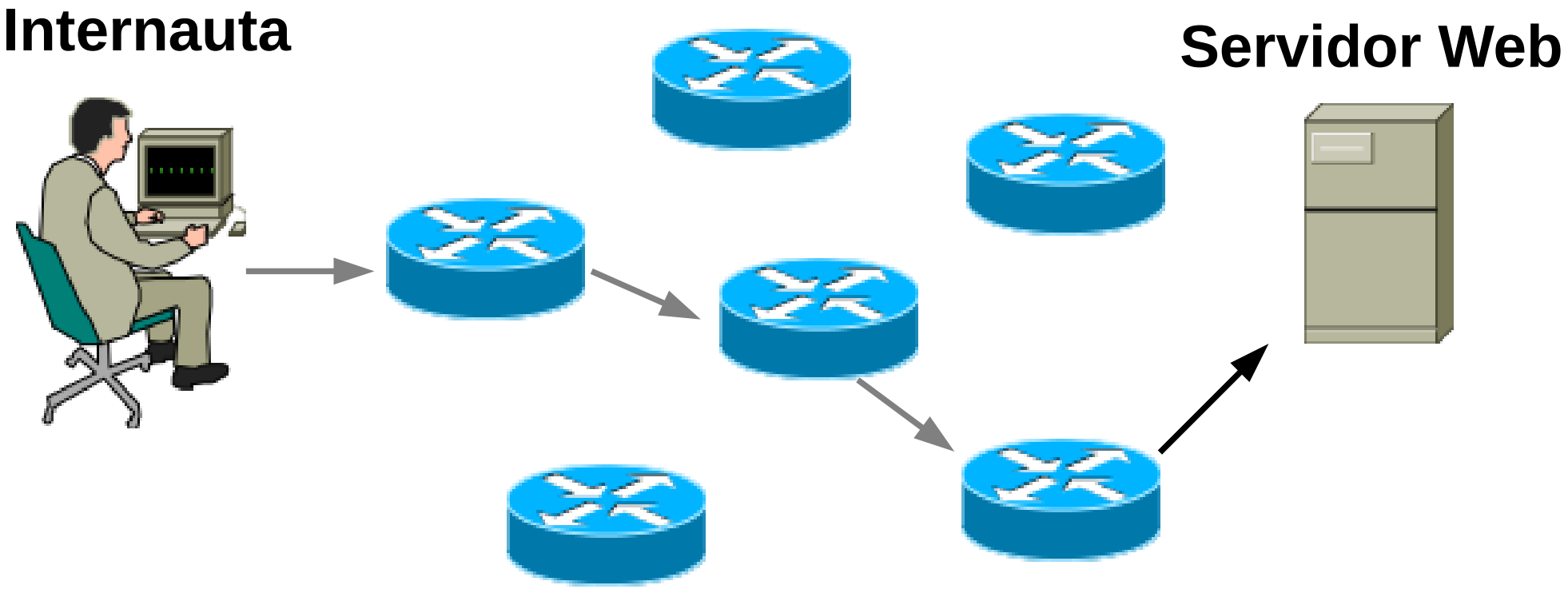

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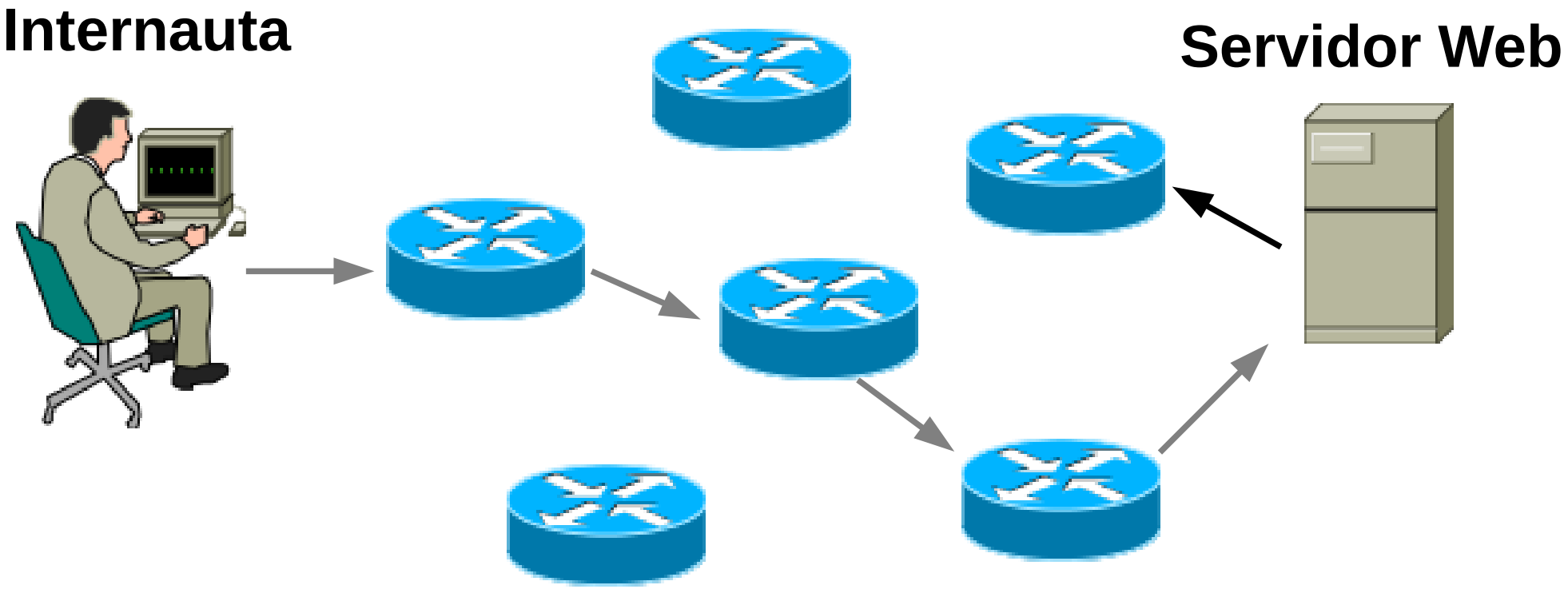

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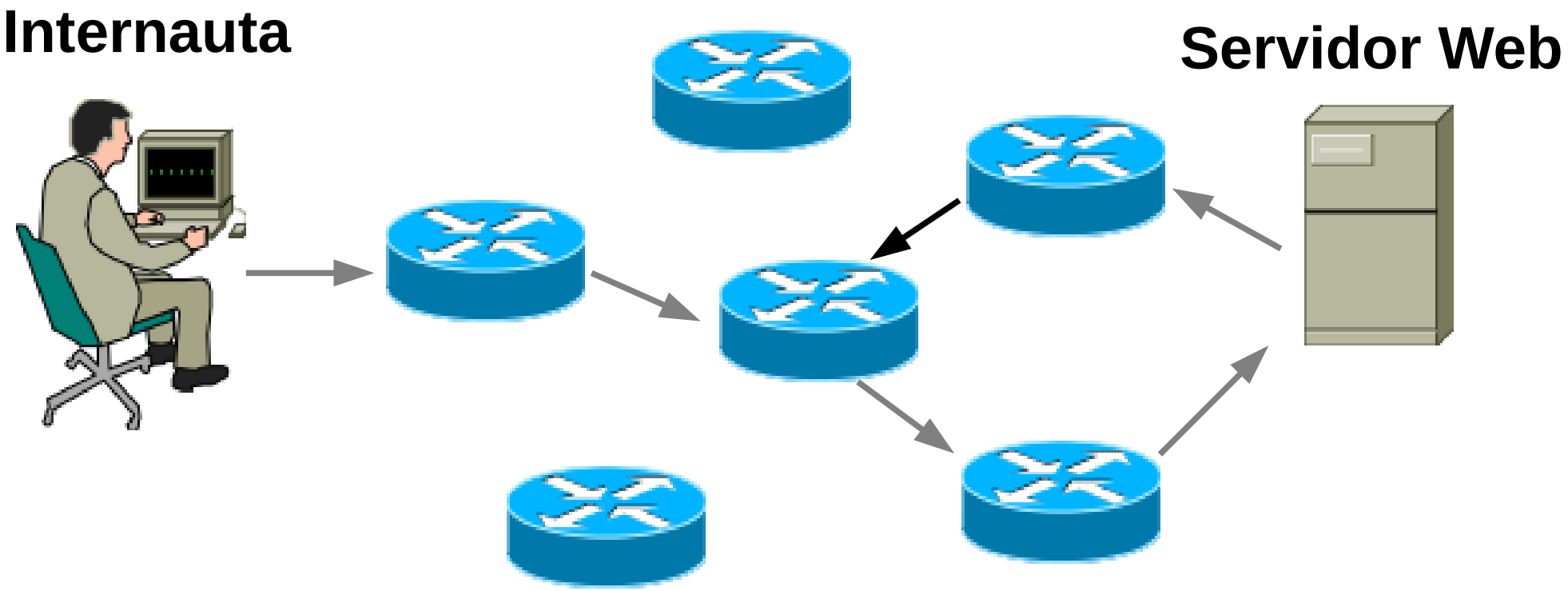

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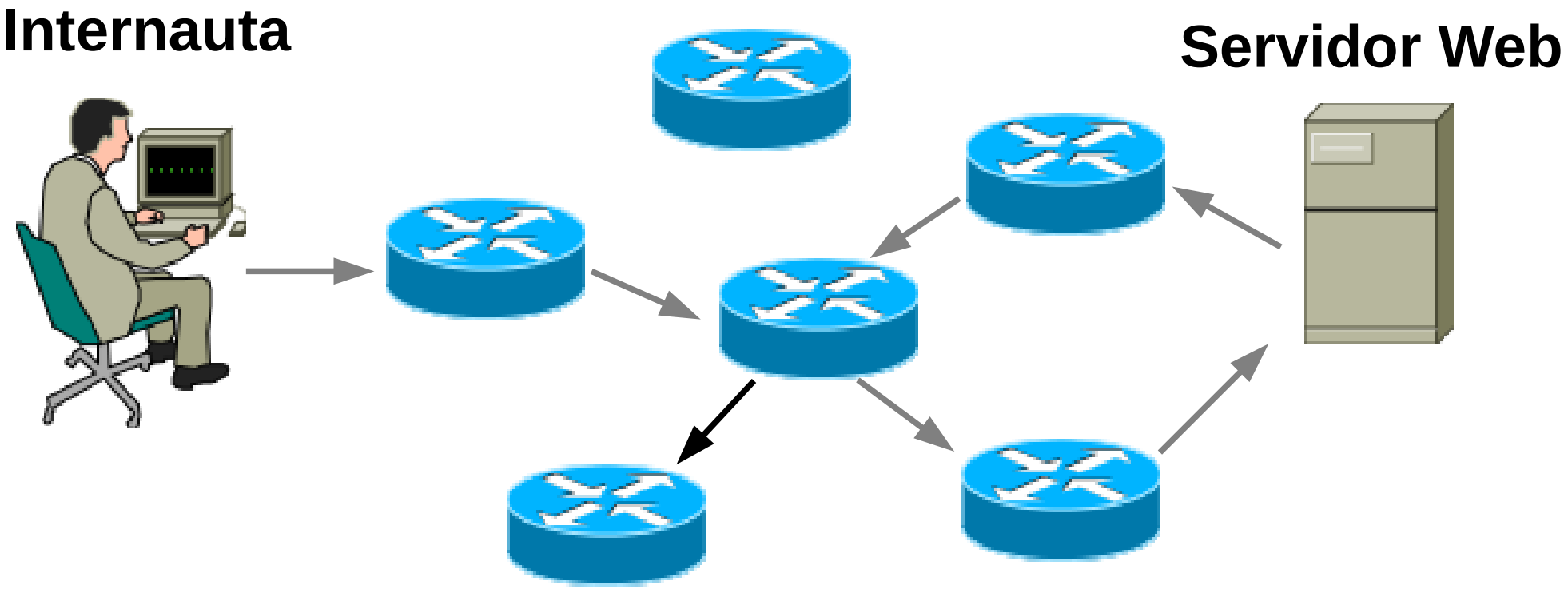

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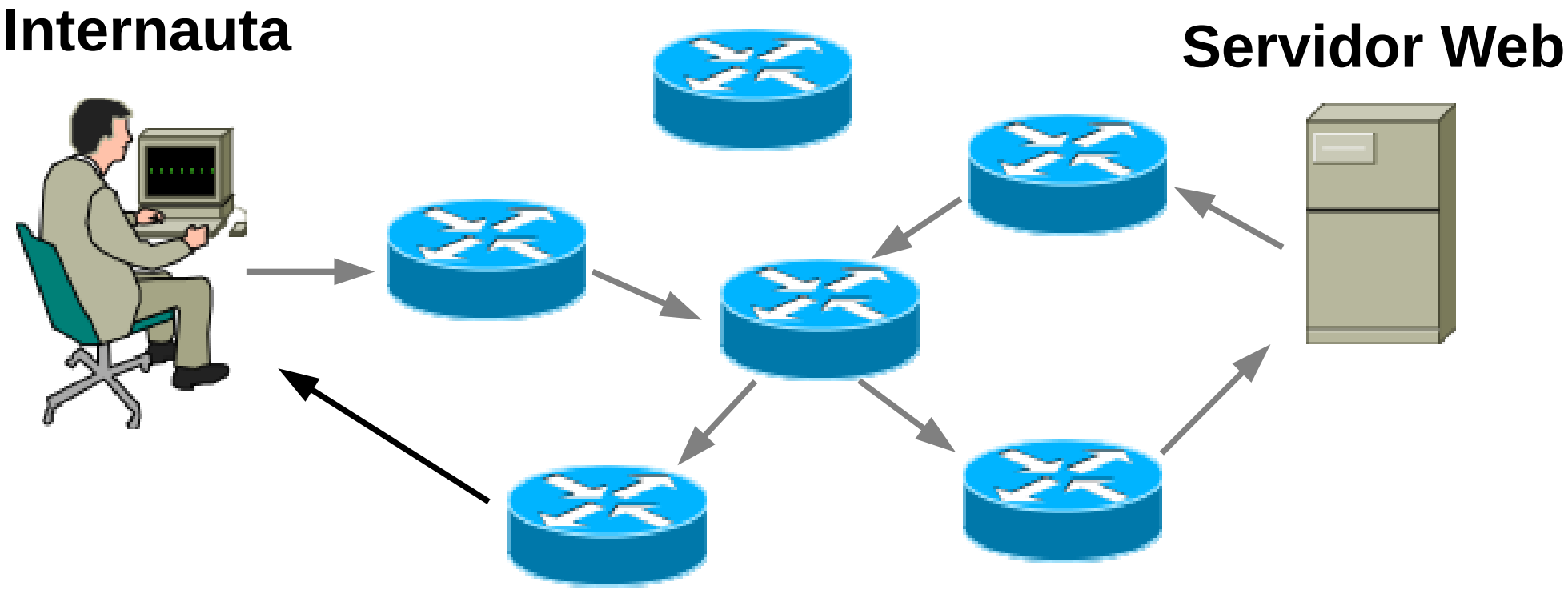
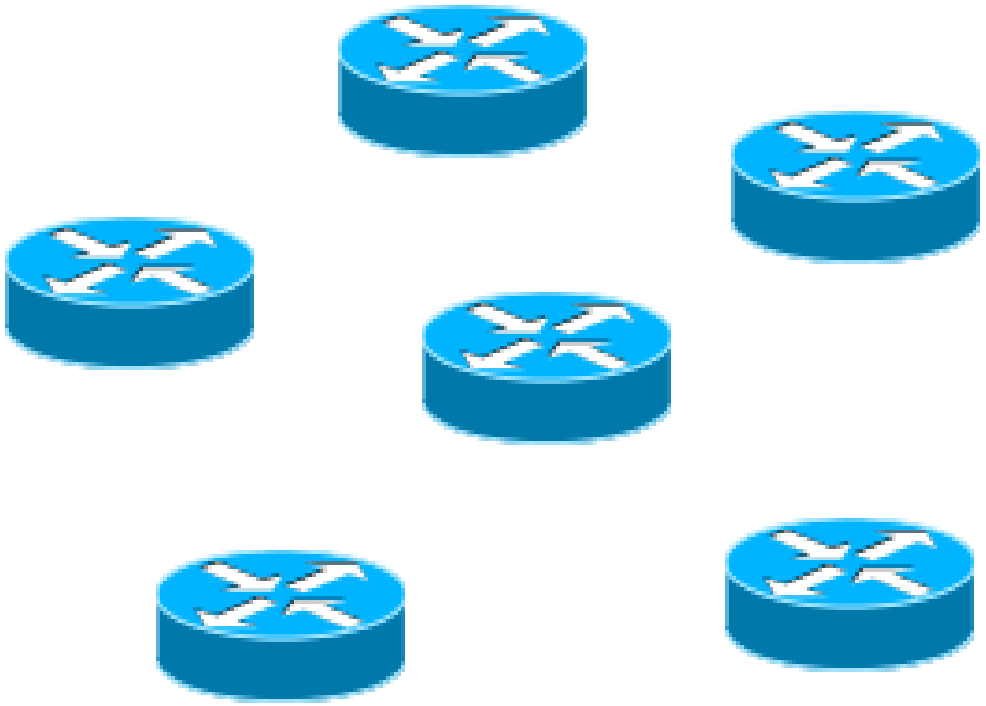


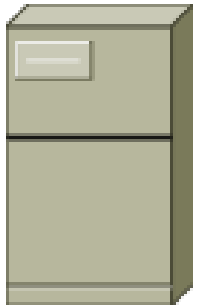
2 – Confiar no Roteamento Provedores?

ROTEAMENTO

Internauta



Servidor Web



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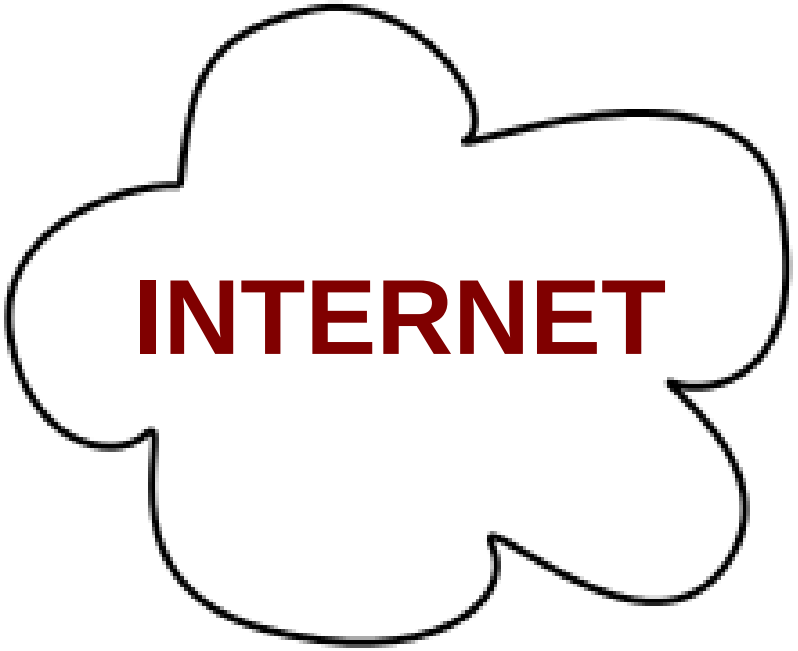
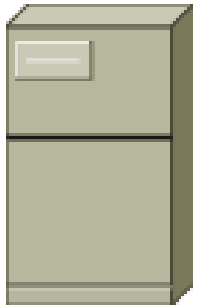
Internauta



Servidor Web



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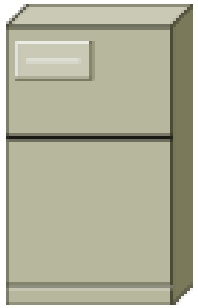

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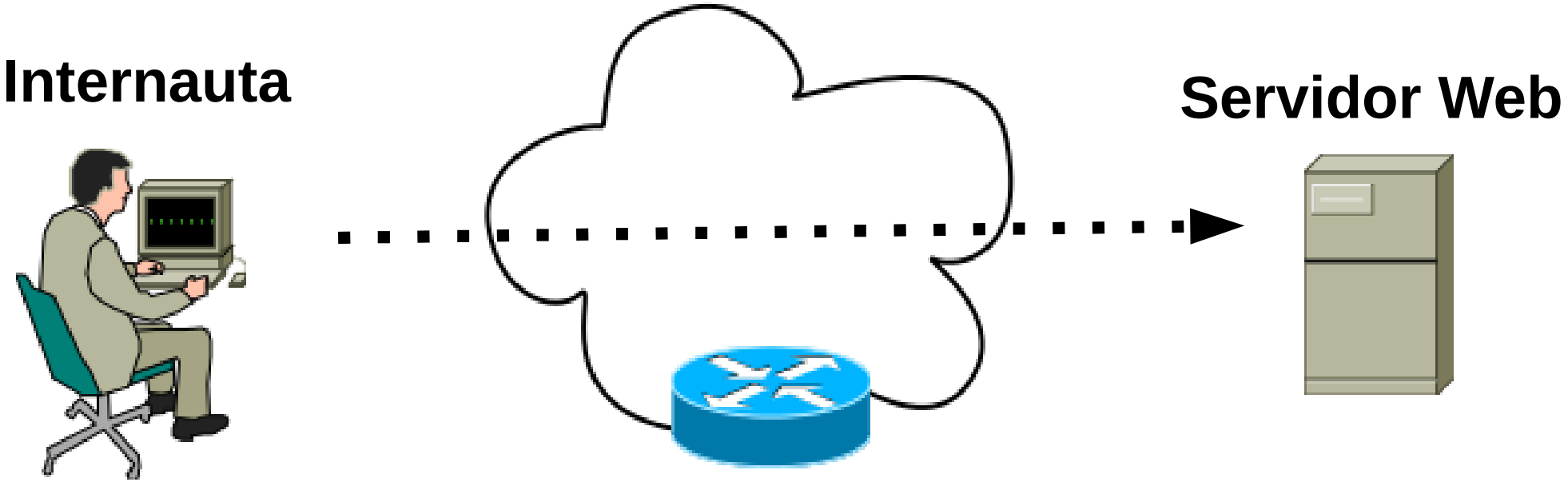

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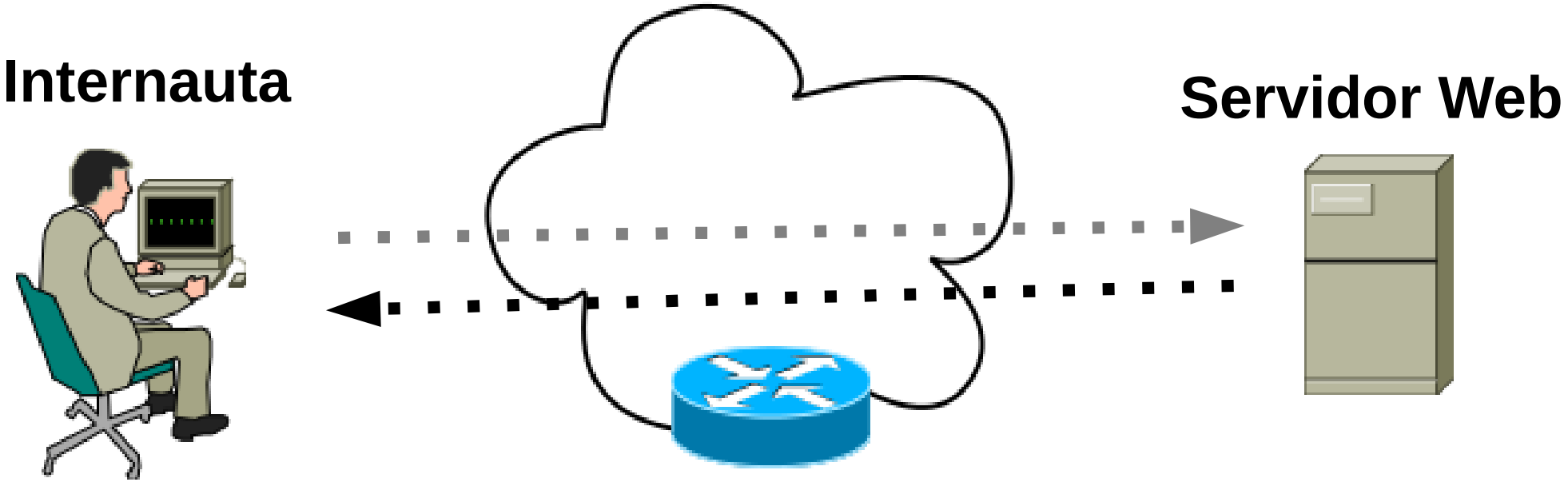

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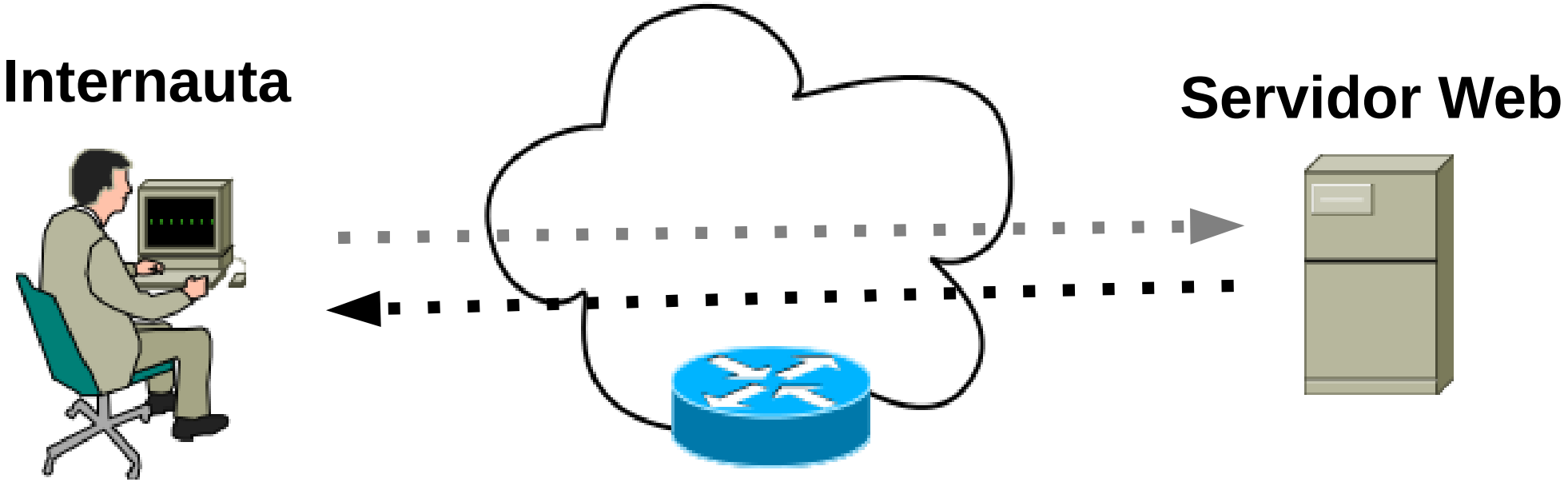

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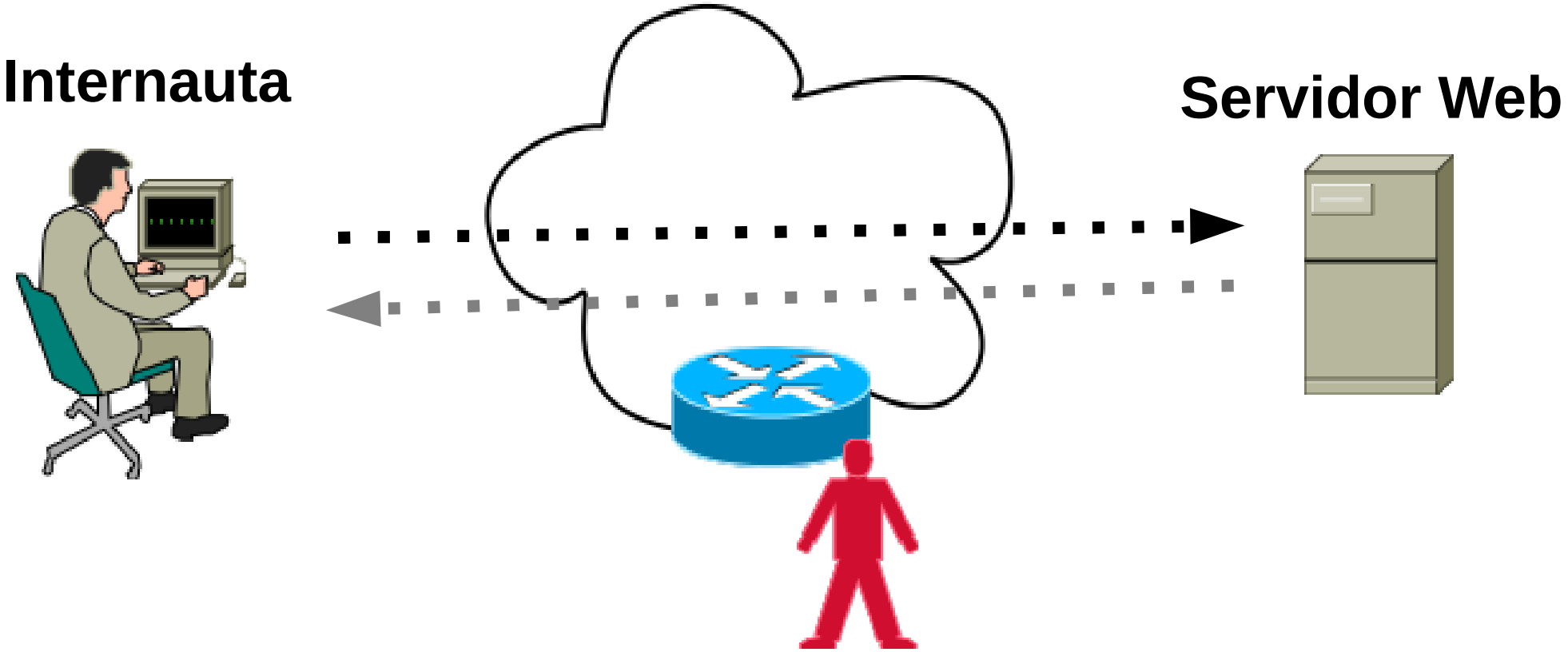

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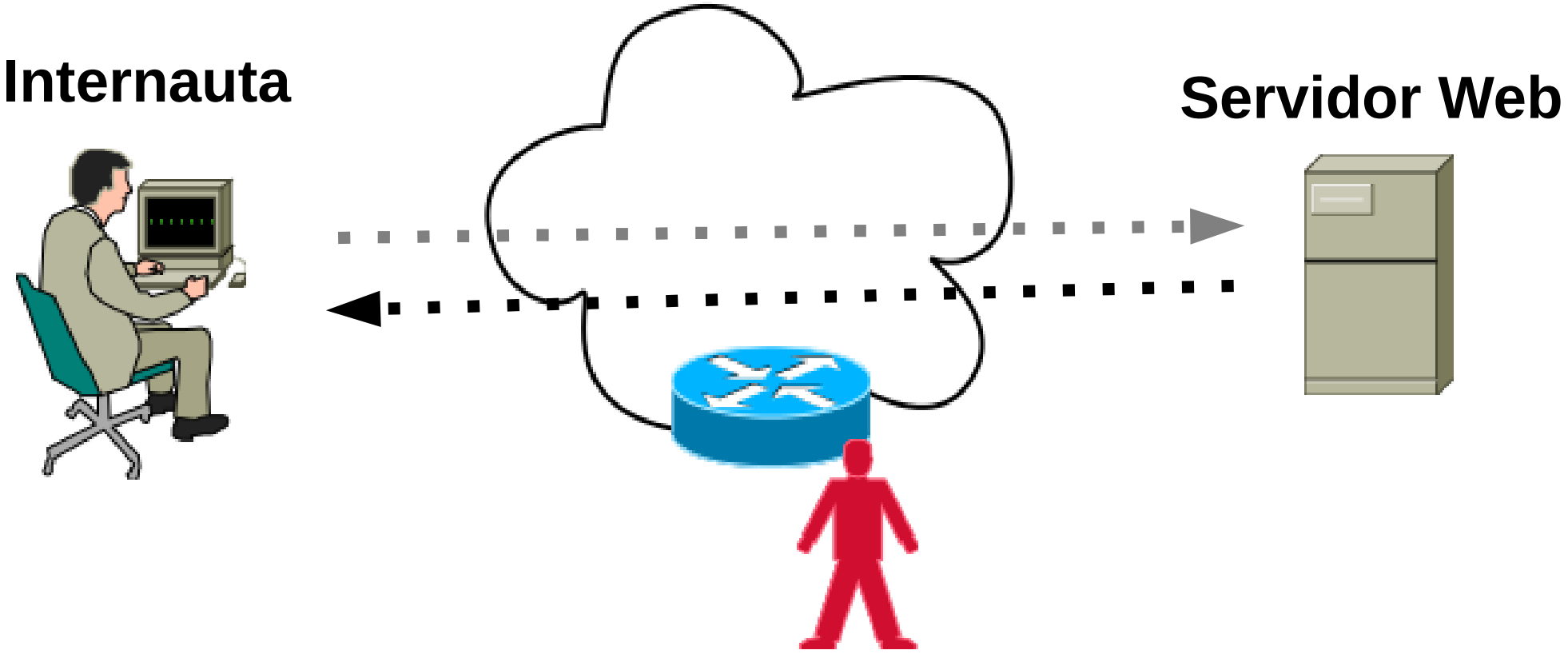
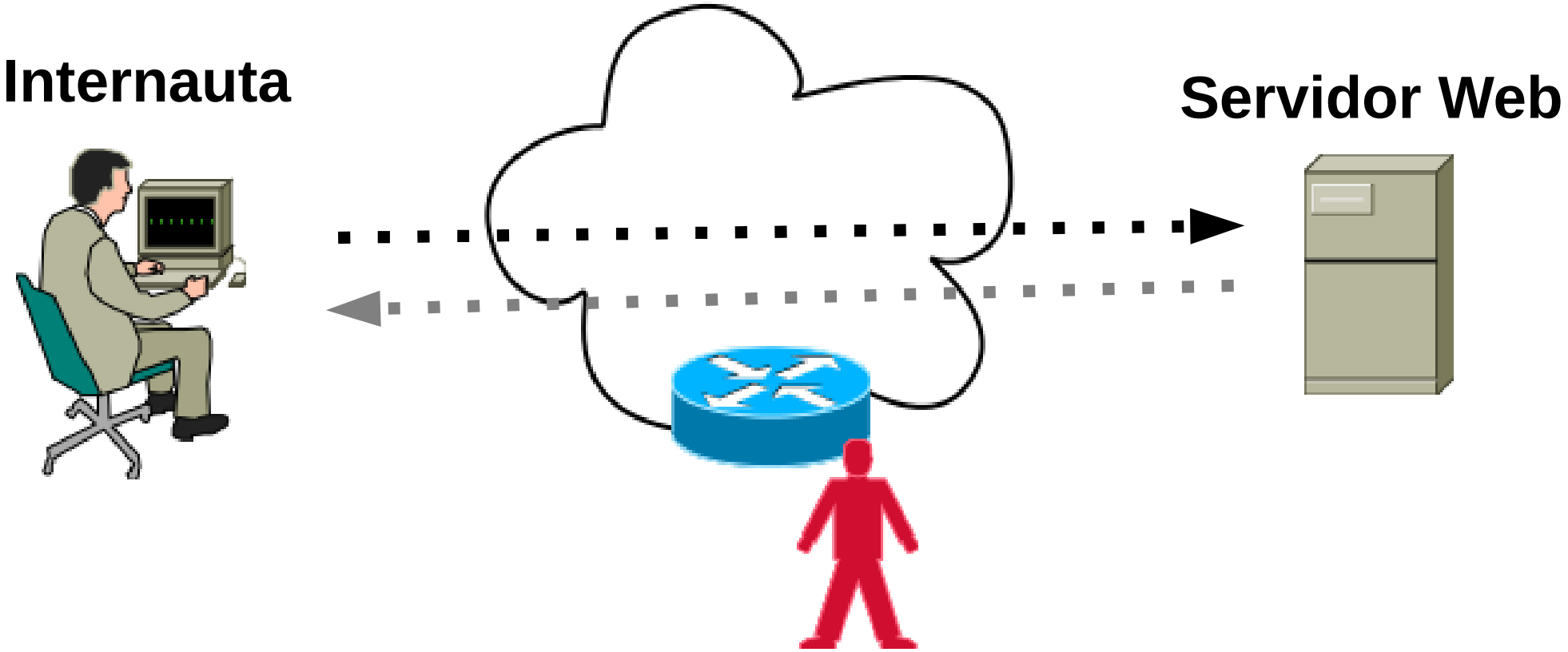


Posso VER o tráfego aberto!

2 – Confiar no Roteamento Provedores?



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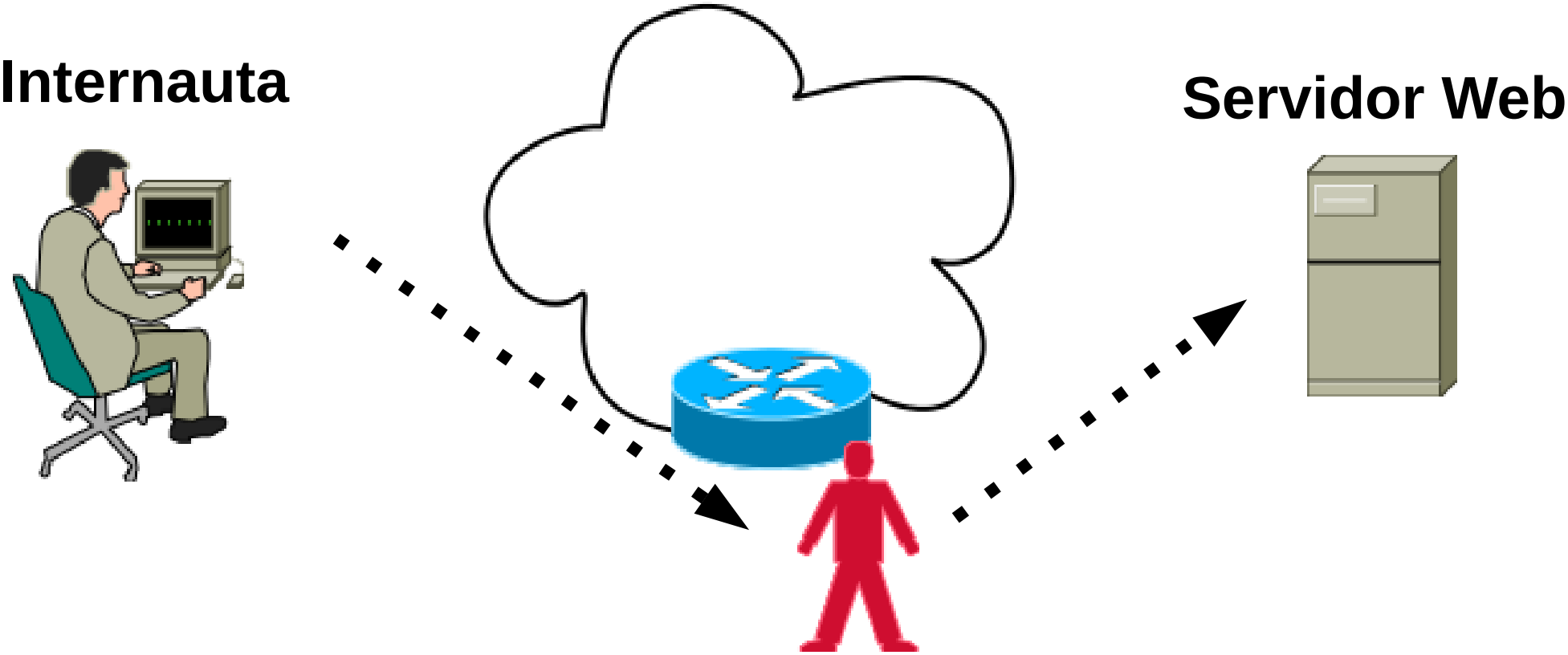
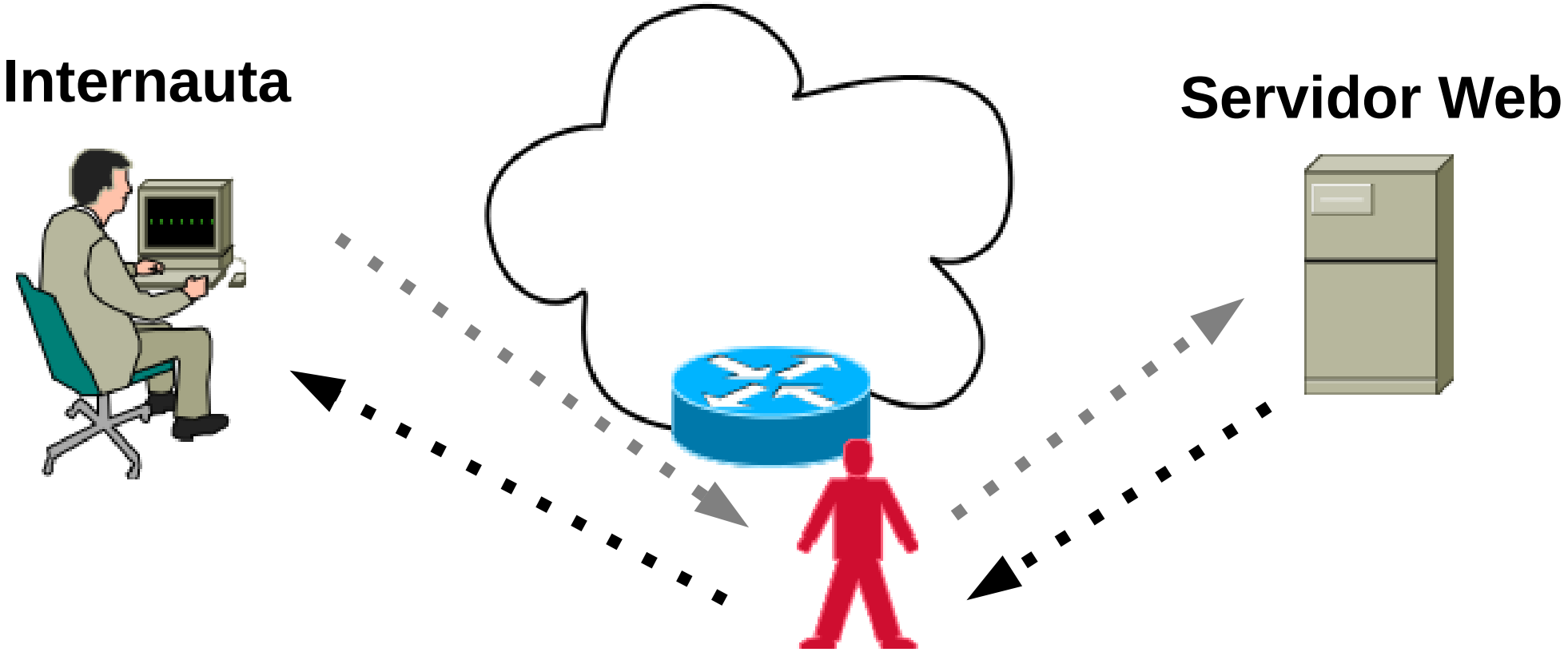


Posso ALTERAR o tráfego aberto!

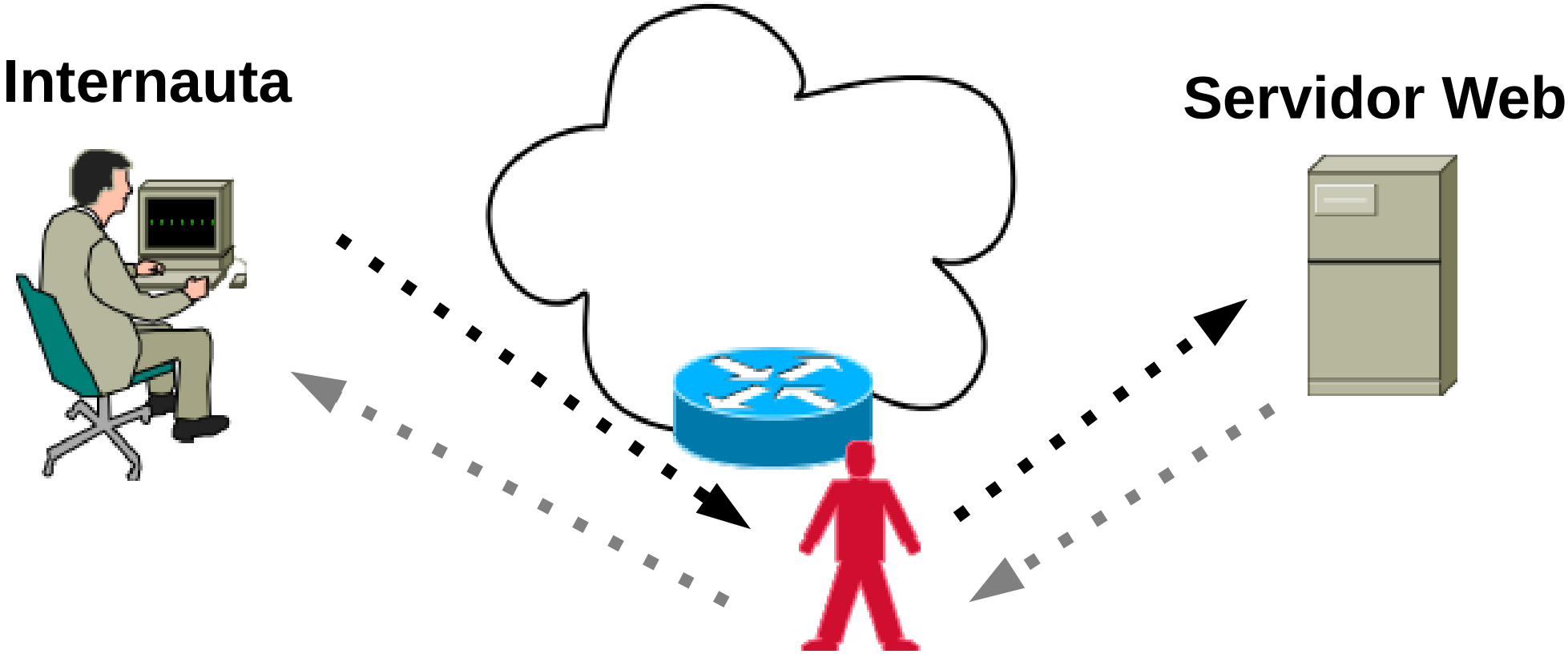
2 – Confiar no Roteamento Provedores?



Posso ALTERAR o tráfego aberto!

2 – Confiar no Roteamento Provedores?

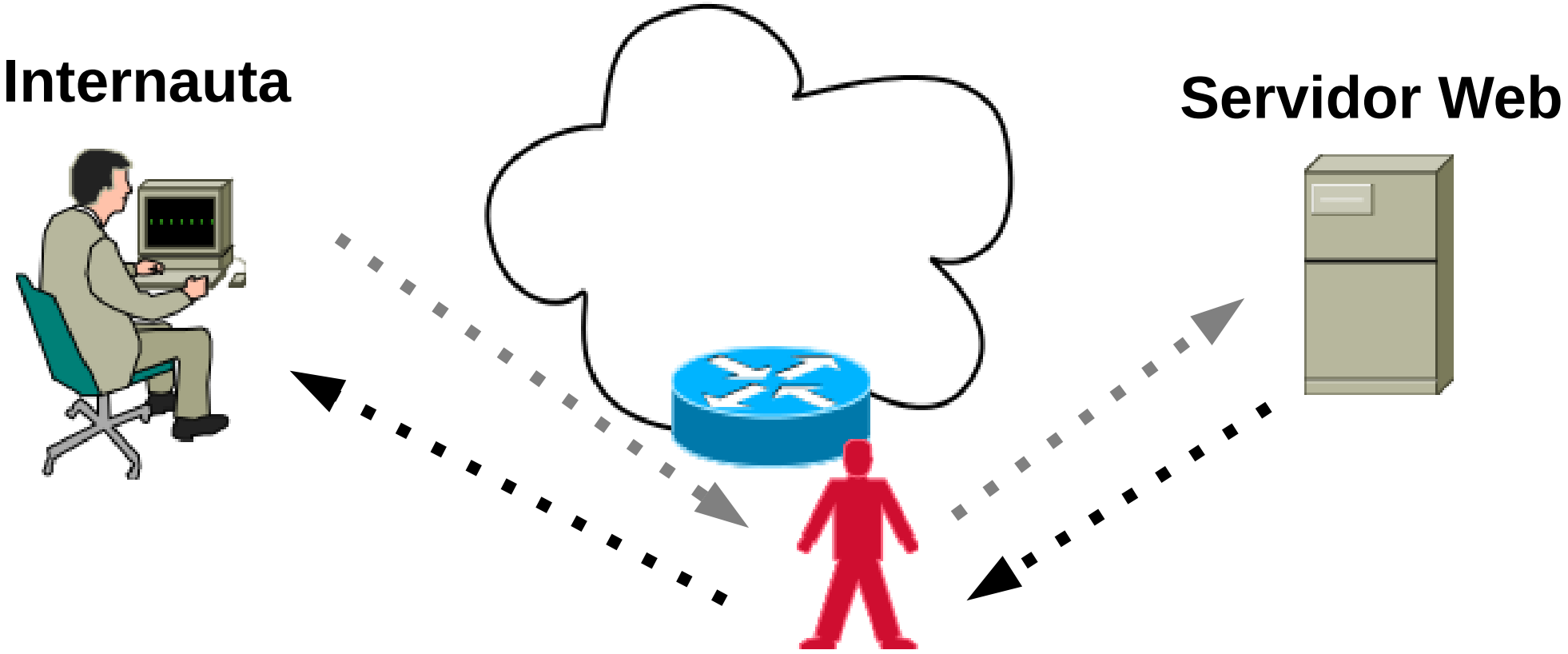
Ataque do Homem Intermediário



Posso ALTERAR o tráfego aberto!

2 – Confiar no Roteamento Provedores?

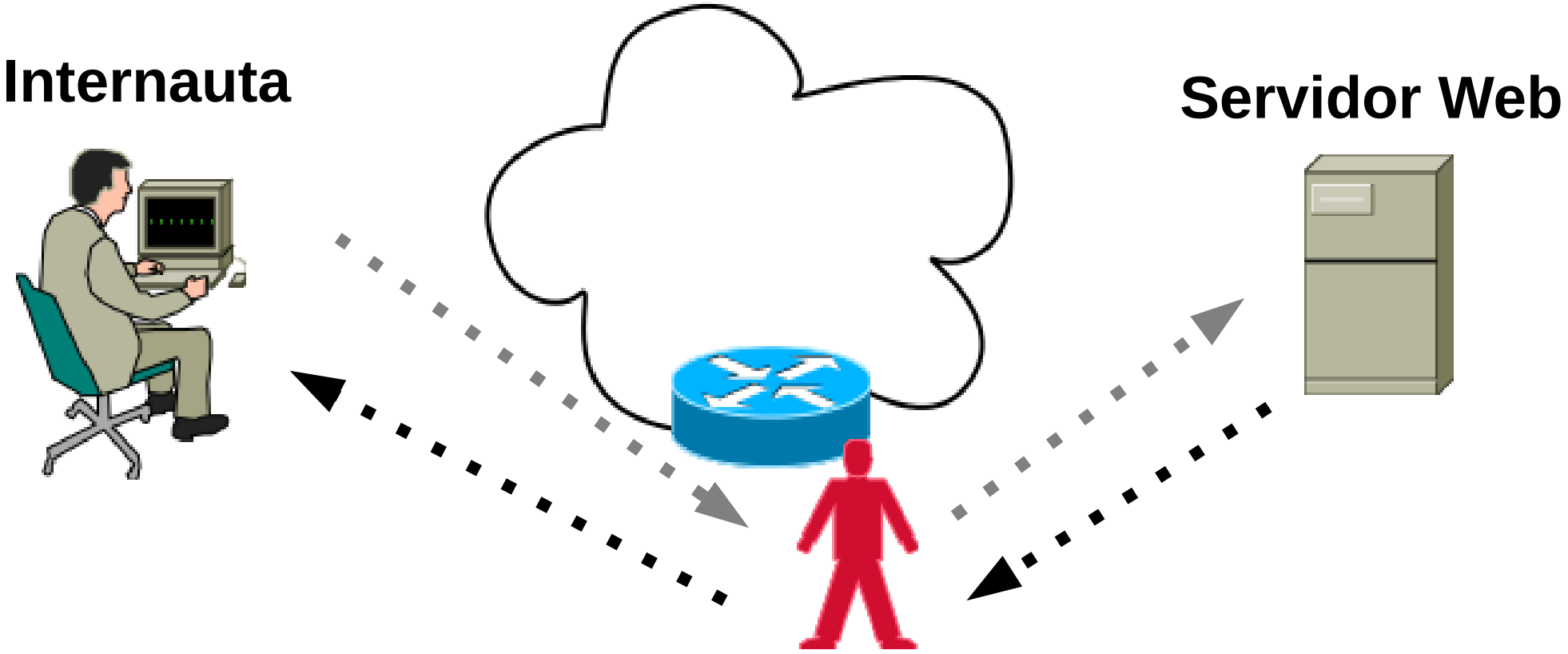
Ataque do Homem Intermediário



Posso ALTERAR o tráfego aberto!

2 – Confiar no Roteamento Provedores?

Ataque do Homem Intermediário

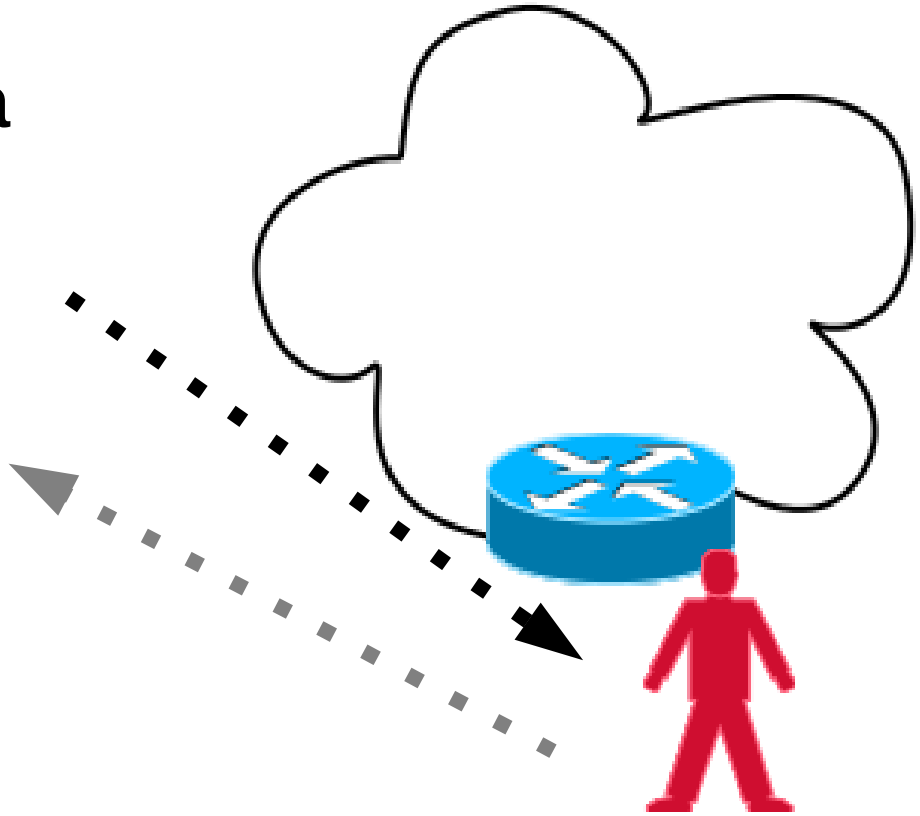


Posso DESVIAR o tráfego!

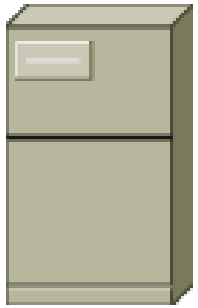
2 – Confiar no Roteamento Provedores?

Ataque do Homem Intermediário

Internauta



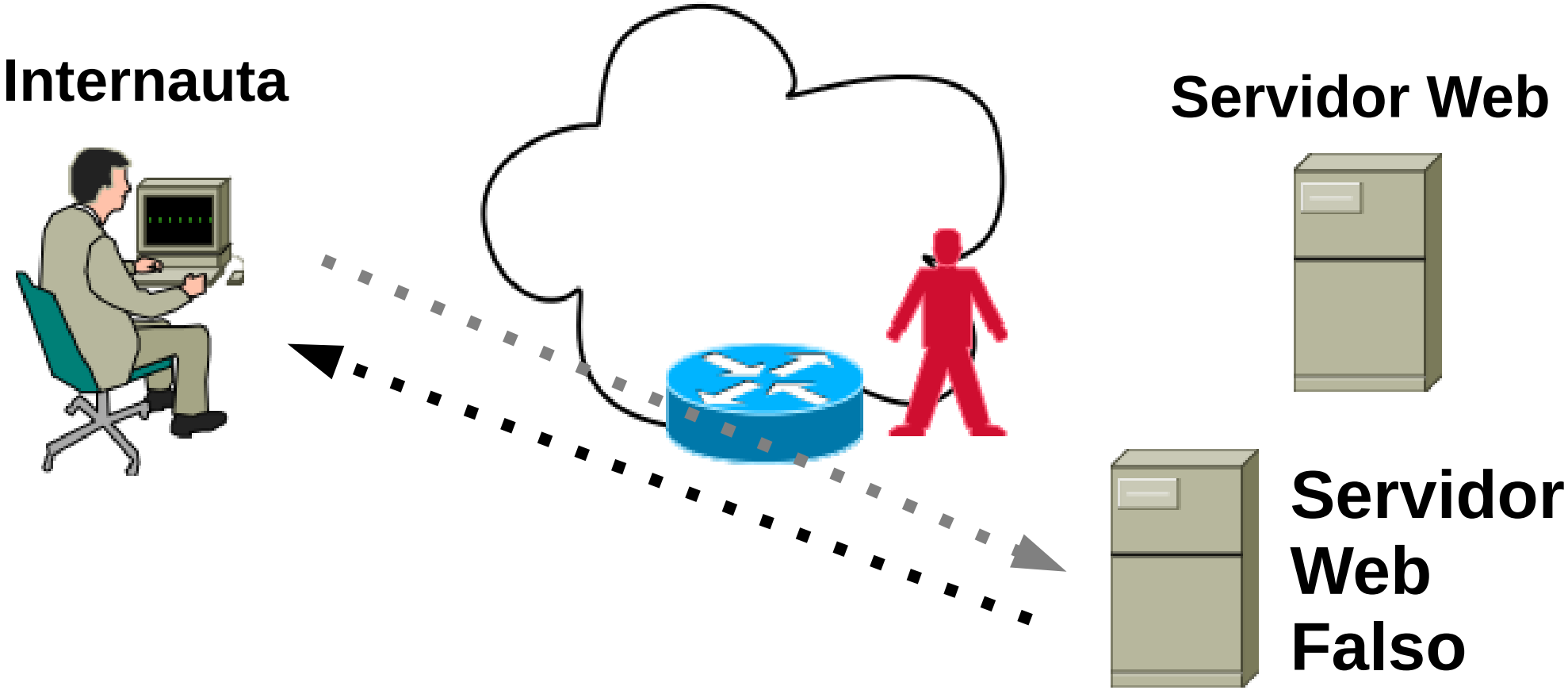
Servidor Web



Posso DESVIAR o tráfego!

2 – Confiar no Roteamento Provedores?

Desvio de rotas!

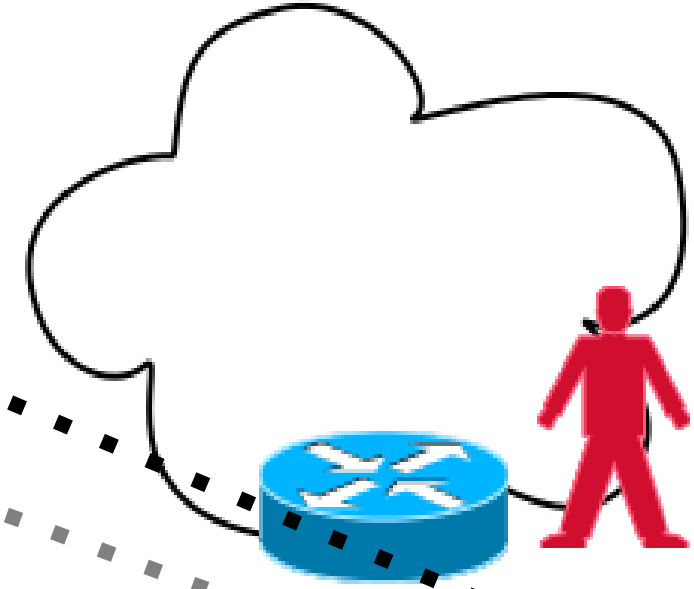


Posso DESVIAR o tráfego!

2 – Confiar no Roteamento Provedores?

Desvio de rotas!

Internauta



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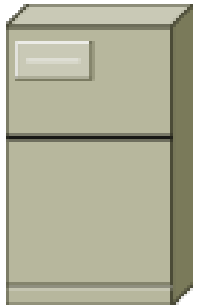
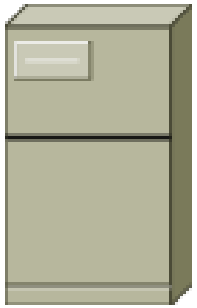


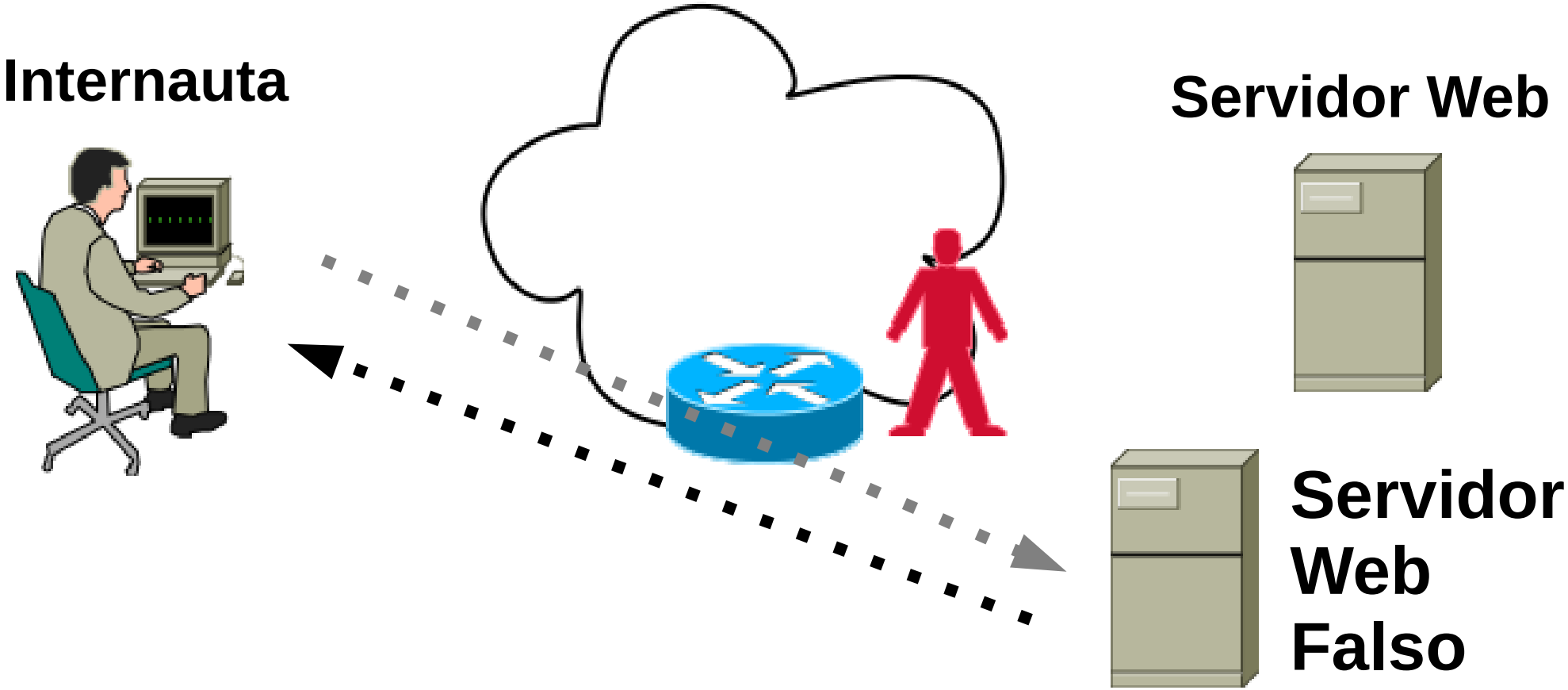


Servidor Web Falso

Posso DESVIAR o tráfego!

2 – Confiar no Roteamento Provedores?

Desvio de rotas!



Posso DESVIAR o tráfego!

2 – Confiar no Roteamento Provedores?

Desvio de rotas!

Internauta

Servidor Web

Servidor Web Falso

DESVIAR o tráfego!

2 – Confiar no Roteamento Provedores?

CELEPAR INFORMÁTICA do PARANÁ

Incidente de Segurança

Renesys identifica rotas estranhas Fev/2013

2 – Confiar no Roteamento Provedores?

CELEPAR INFORMÁTICA do PARANÁ

Incidente de Segurança

Renesys identifica rotas estranhas Fev/2013

Traceroute Path 2: from Denver, CO to Denver, CO via *Iceland*

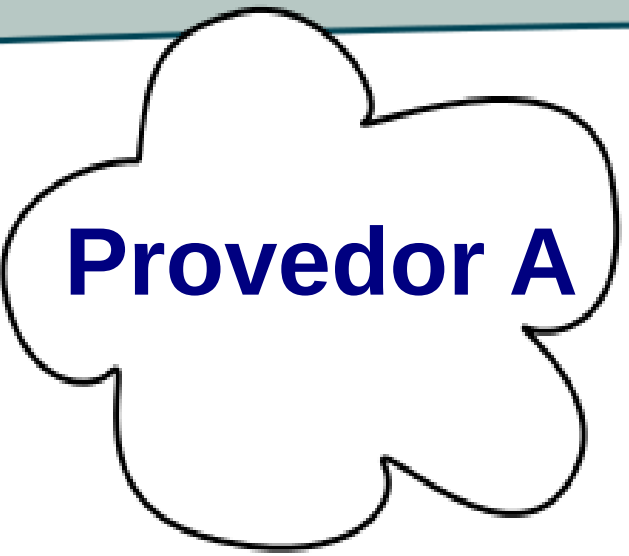
2 – Confiar no Roteamento Provedores?

CELEPAR INFORMÁTICA do PARANÁ

Exemplos de ataques (exploração):

- Sniffing (tráfego aberto)
- Arp Spoofing (rede local)
- Ataque do Homem Intermediário (MITM)
- Desvio de Rotas
- Protocolos de Roteamento?!?

2 – Confiar no Roteamento Provedores?



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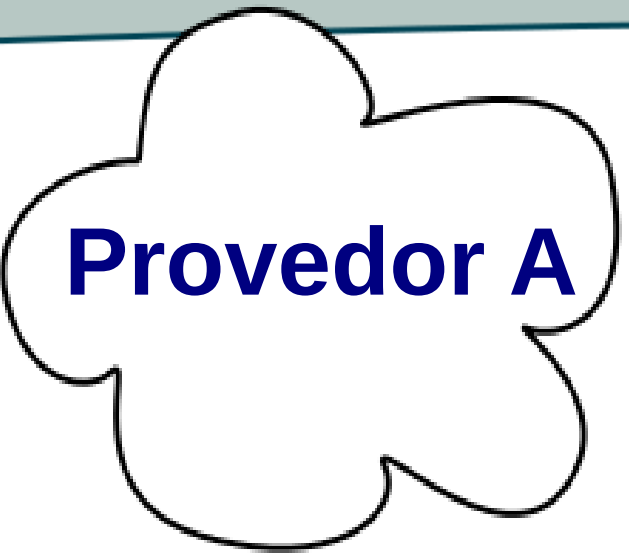

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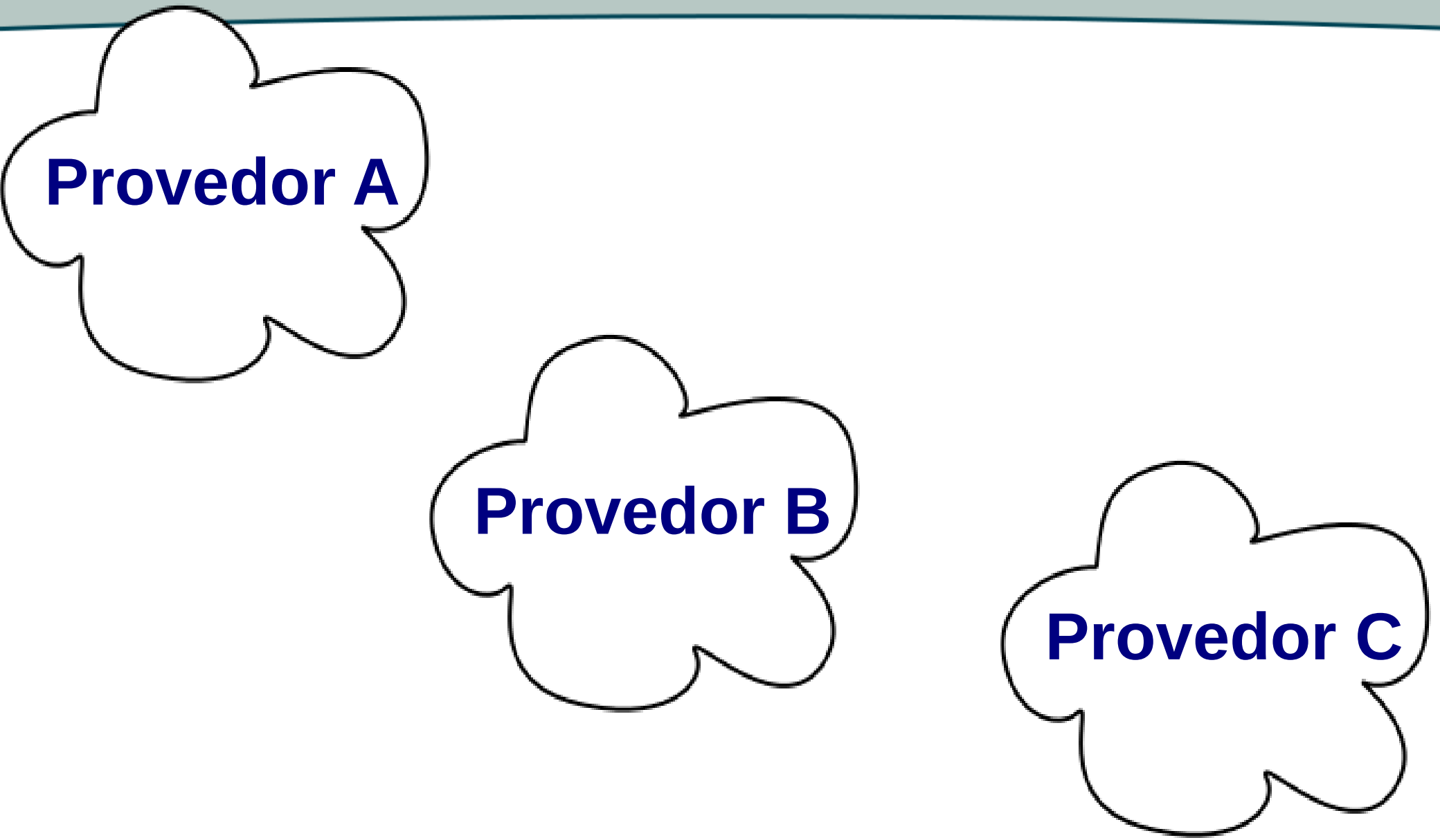

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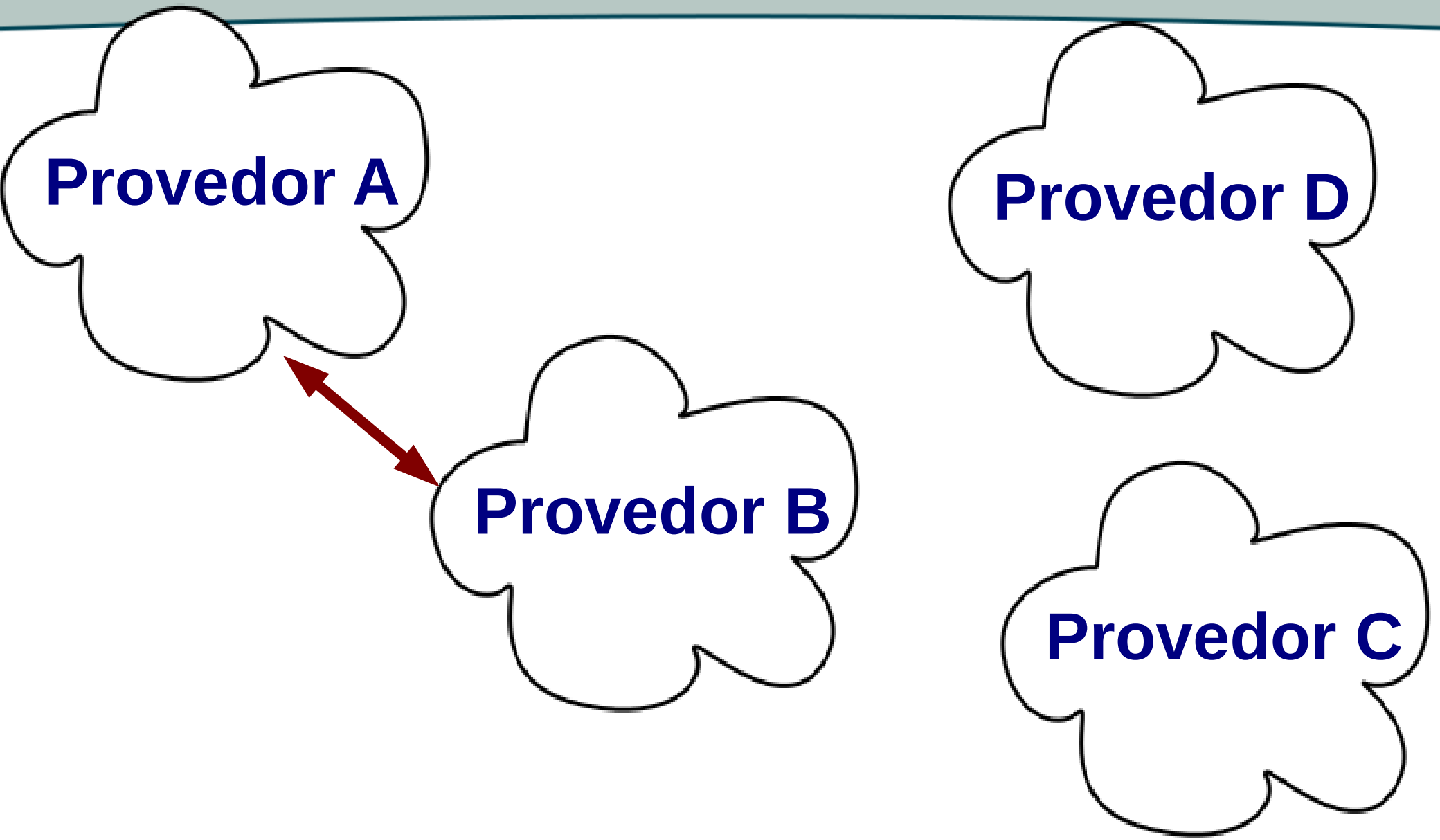

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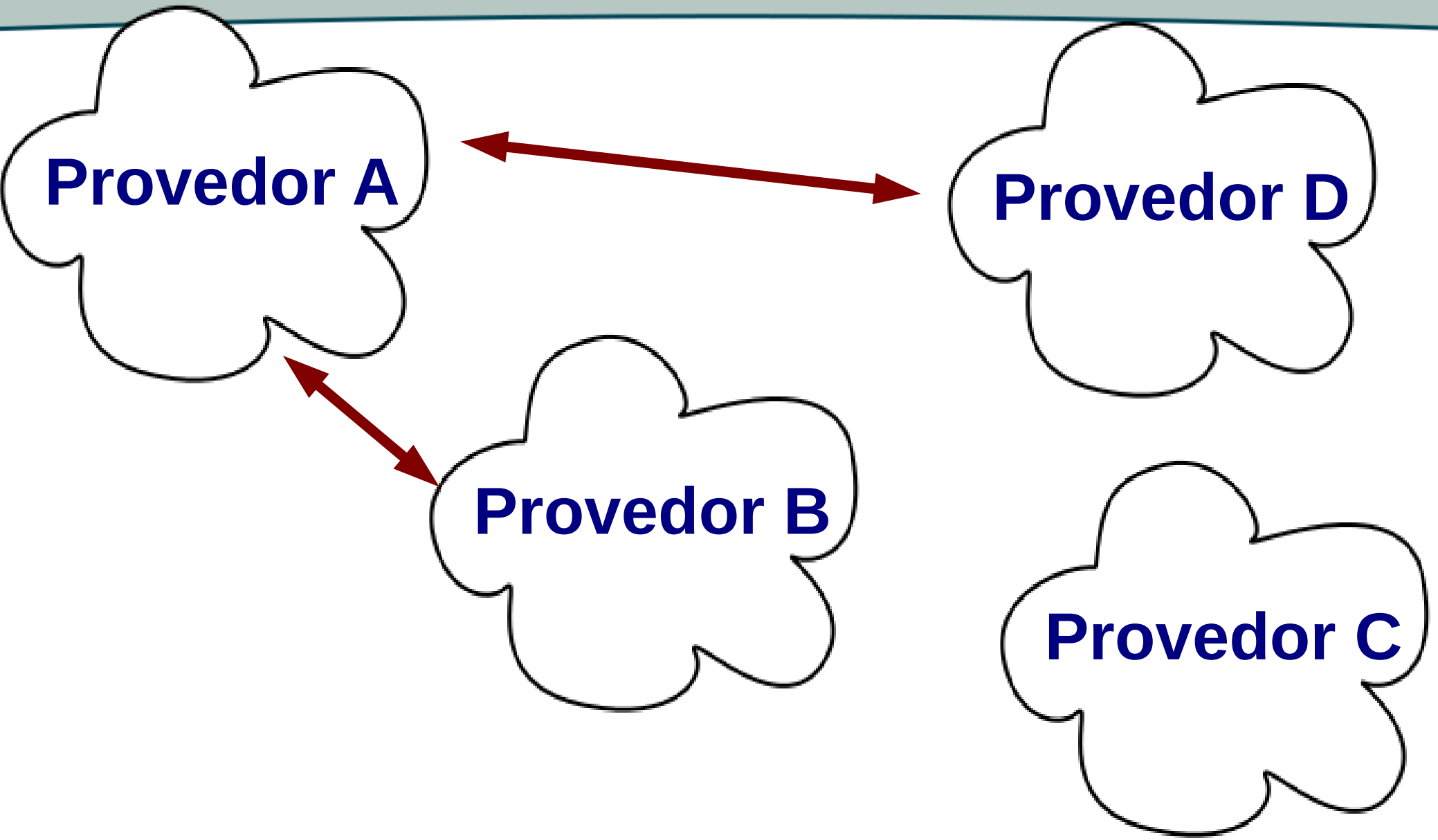

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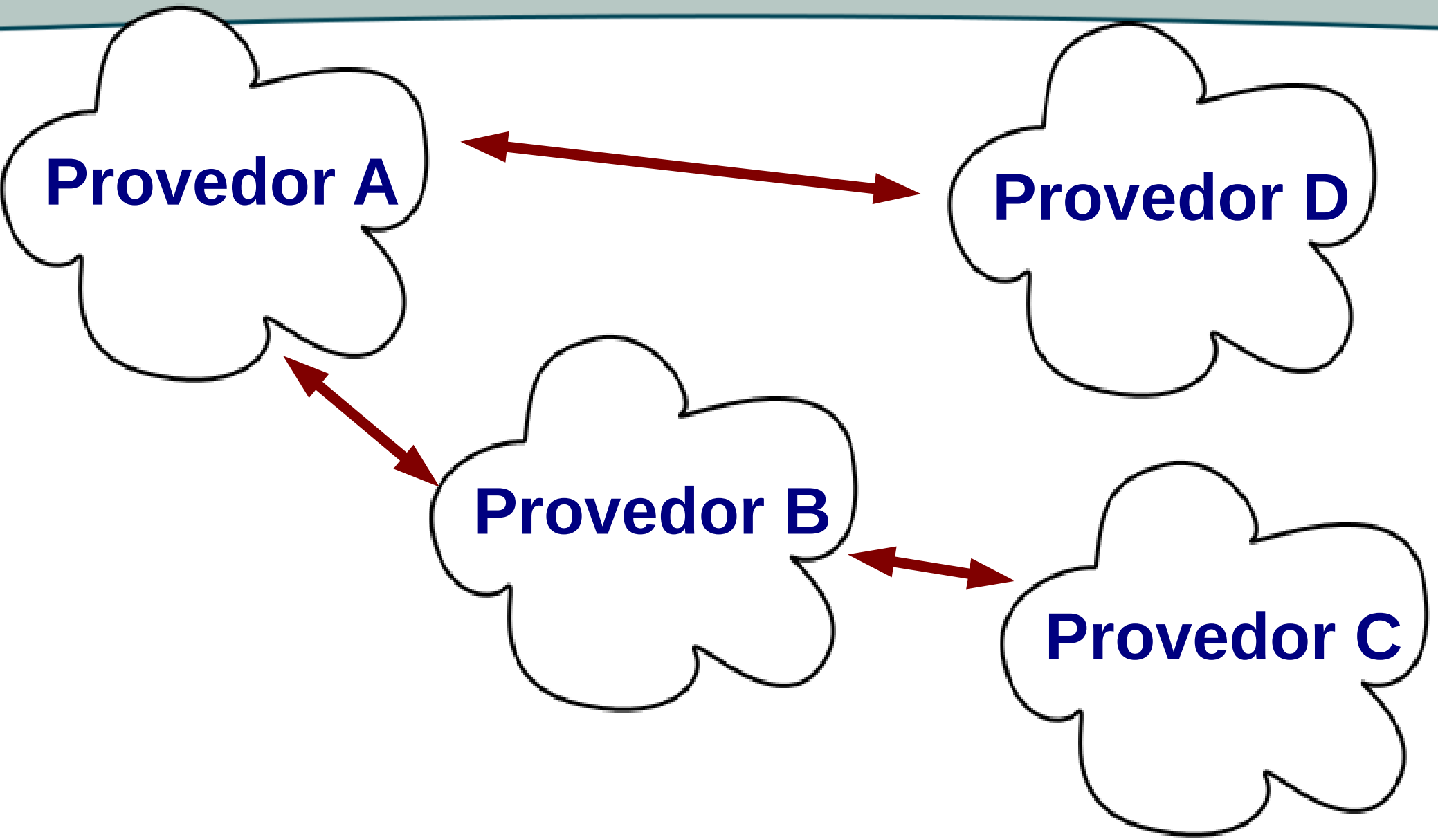

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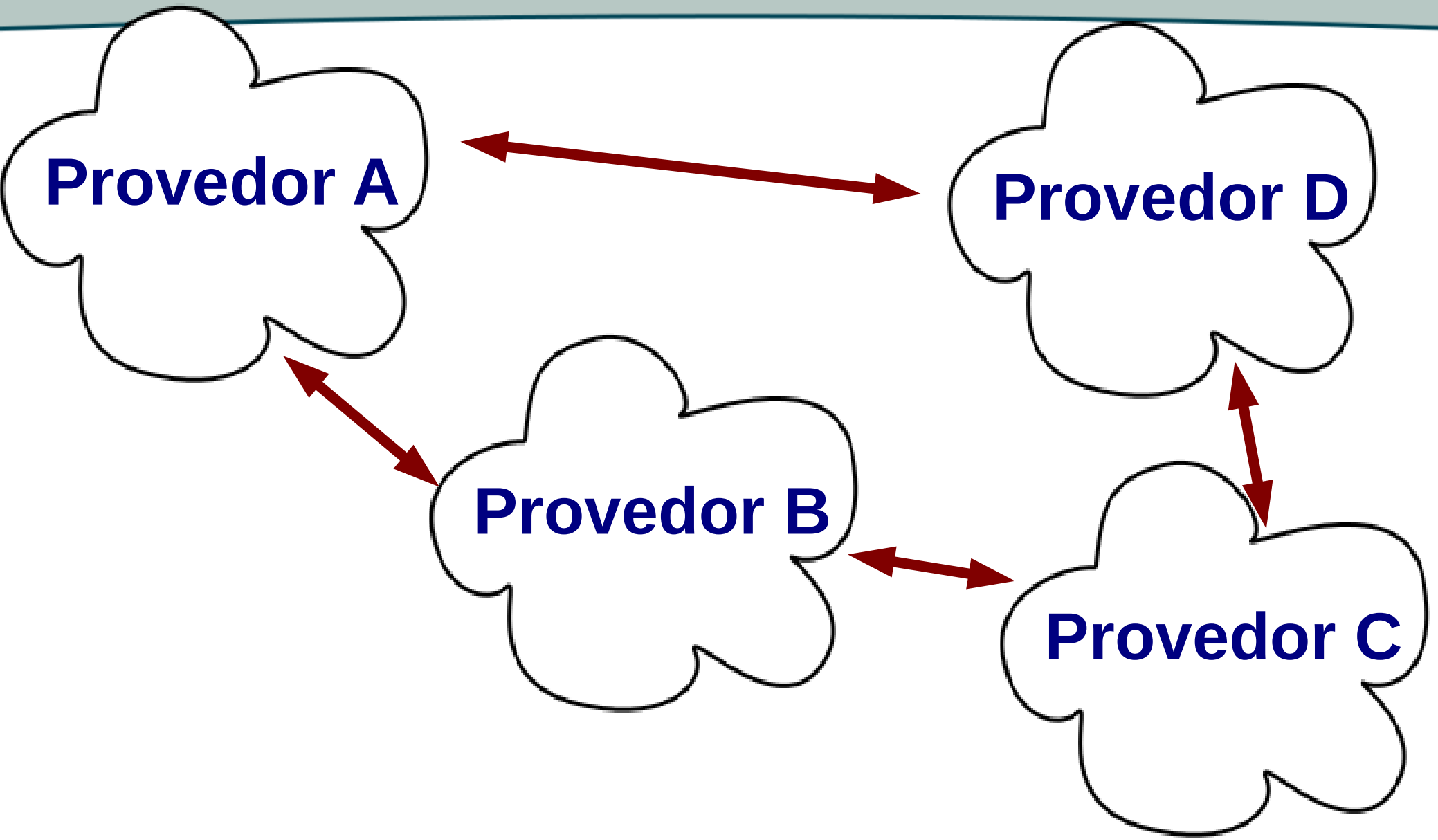

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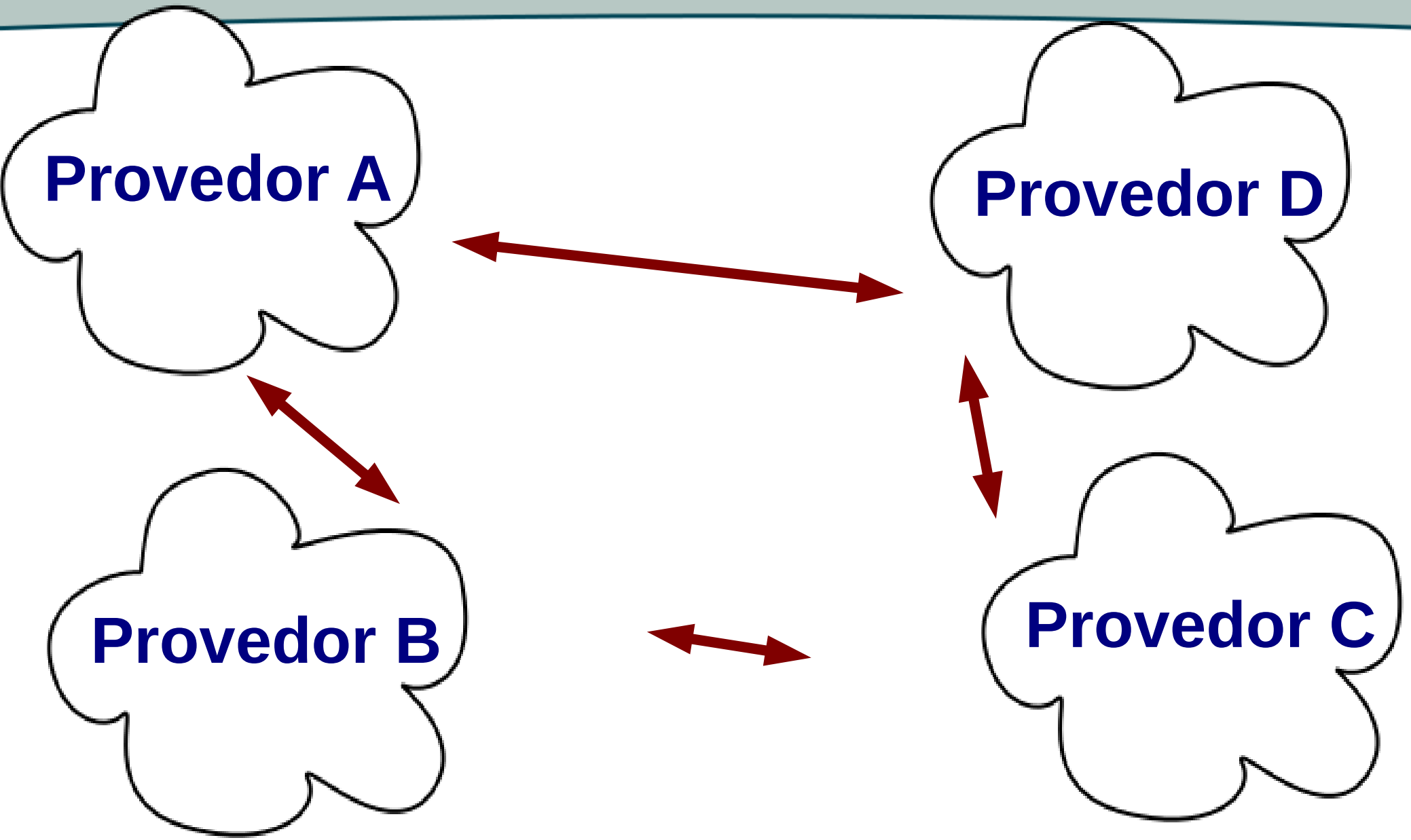

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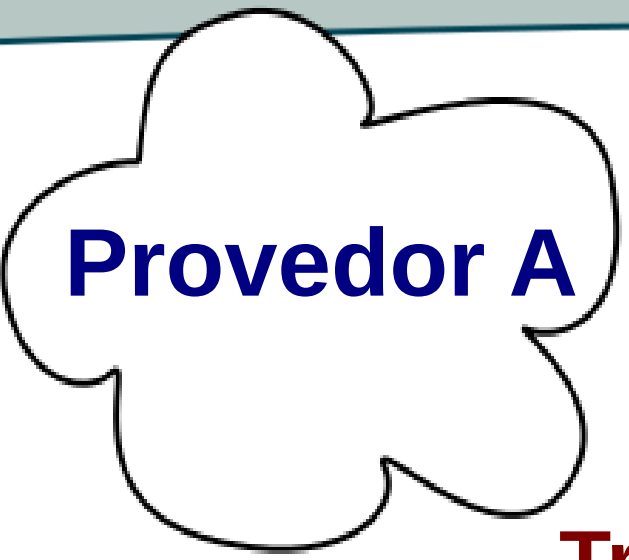
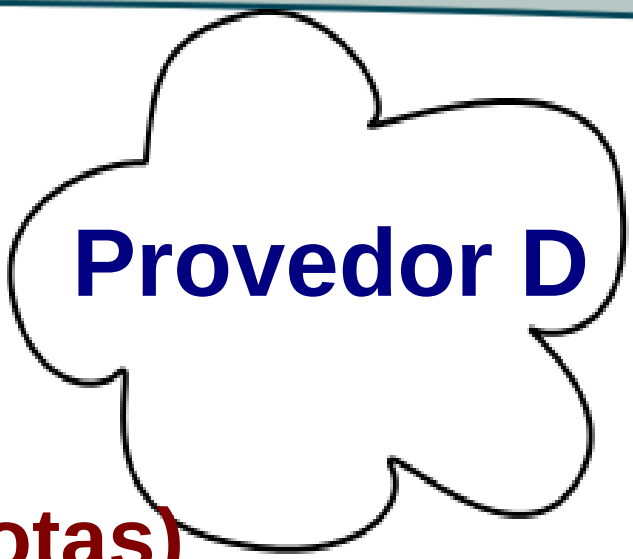
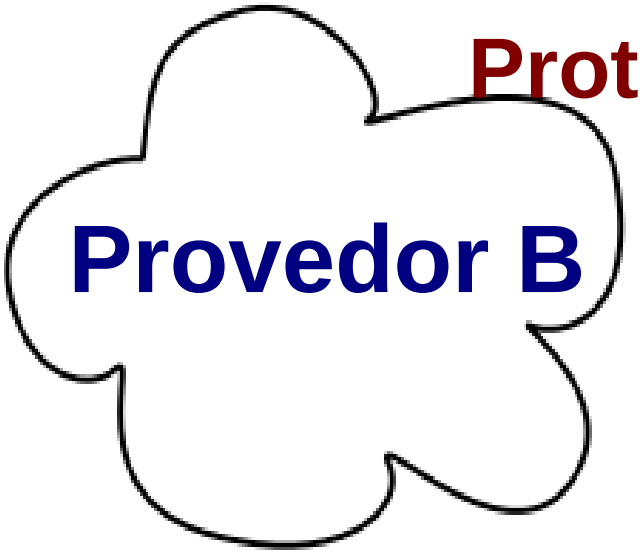




Trocar Caminhos (rotas)

Protocolo de Roteamento



2 – Confiar no Roteamento Provedores?

Provedor A

Provedor D

PROTOCOLO BGP

RFC 1771 – 1995

Border Gateway Protocol

Provedor B

Provedor C

2 – Confiar no Roteamento Provedores?

CELEPAR INFORMÁTICA do PARANÁ

Sistema Autonomo

Sistema Autonomo

Sistema Autonomo

Sistema Autonomo

2 – Confiar no Roteamento Provedores?

CELEPAR INFORMÁTICA do PARANÁ

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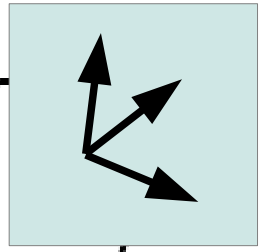

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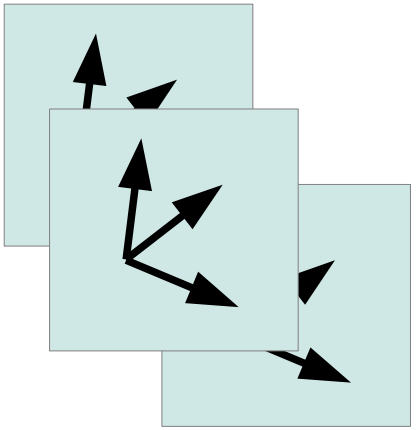

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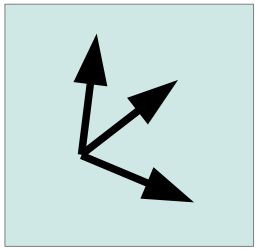

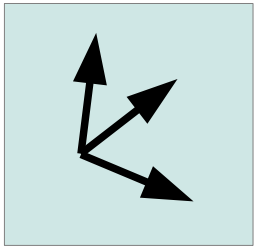

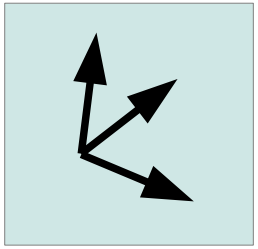

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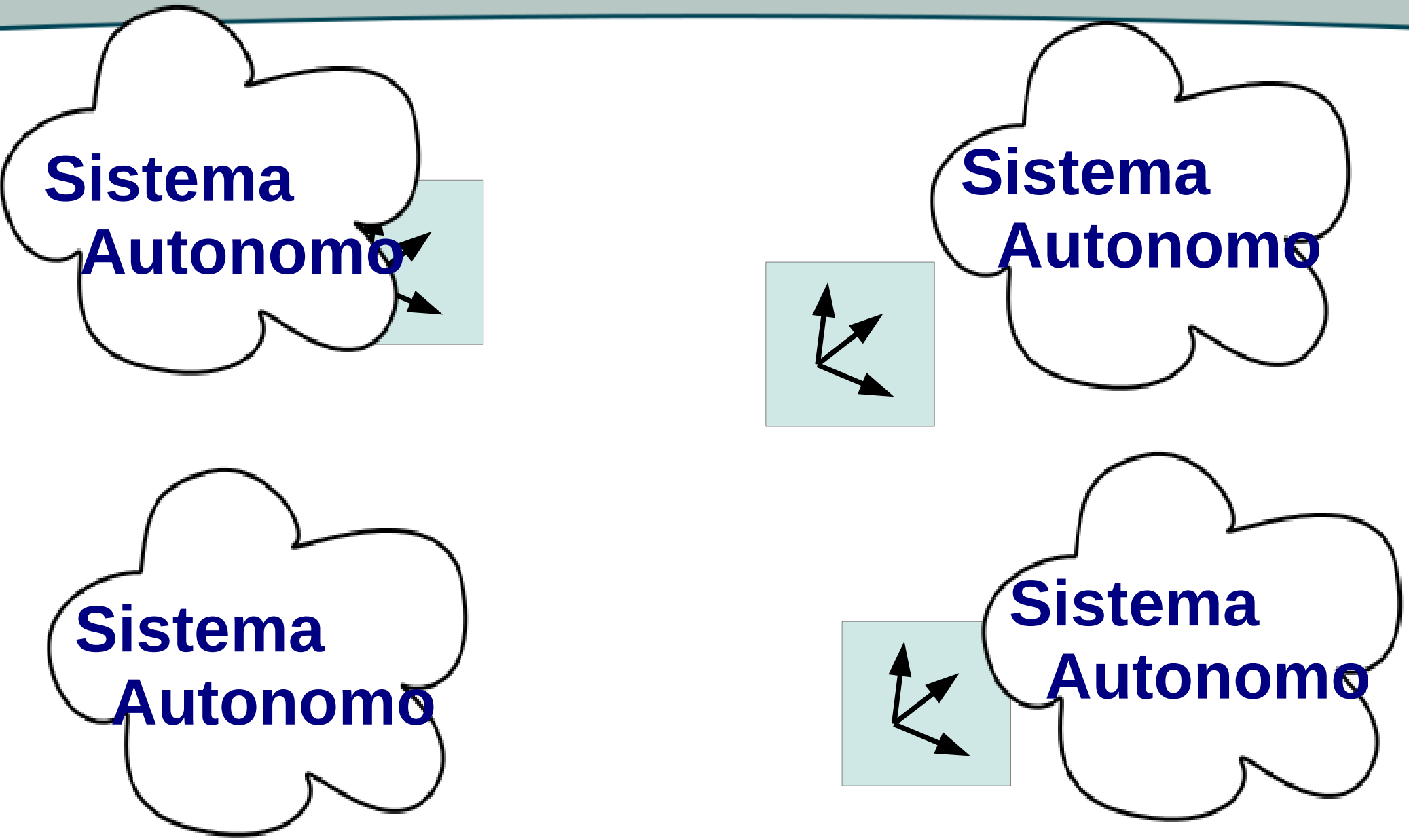

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CELEPAR INFORMÁTICA do PARANÁ

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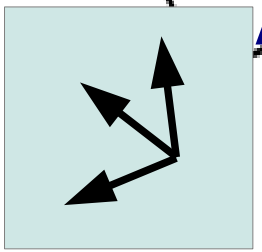

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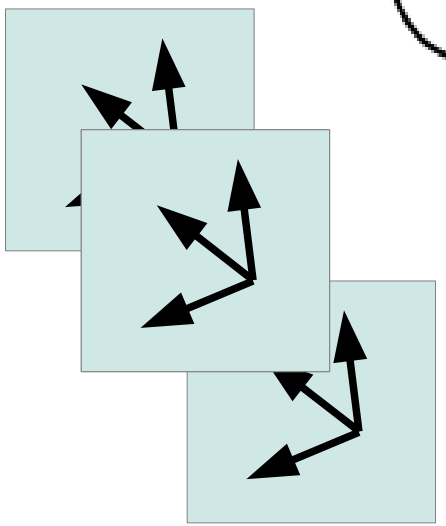

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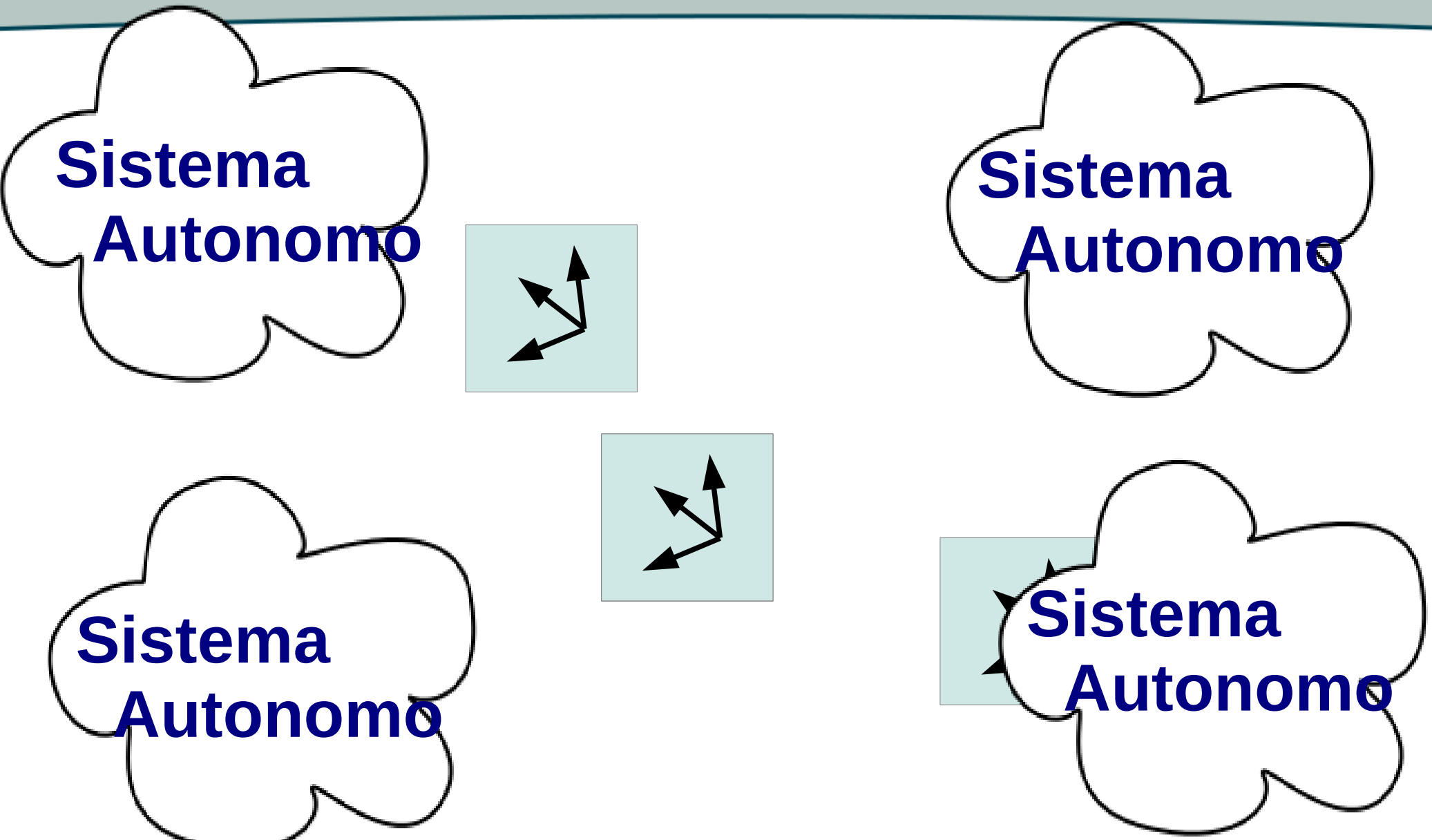
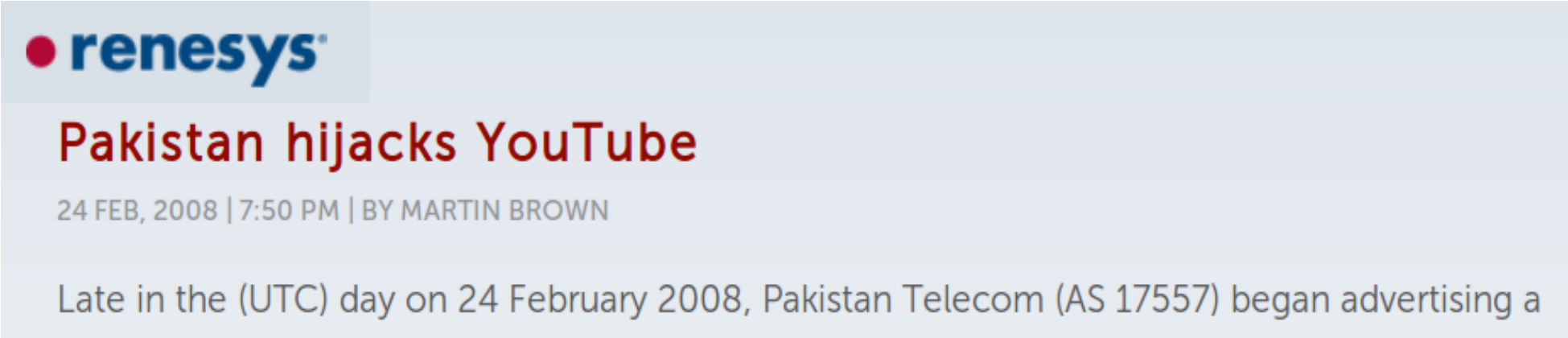


2 – Confiar no Roteamento Provedores?

INCIDENTE DE SEGURANÇA

Em 2008 provedor paquistanês
divulga rede do Youtube!



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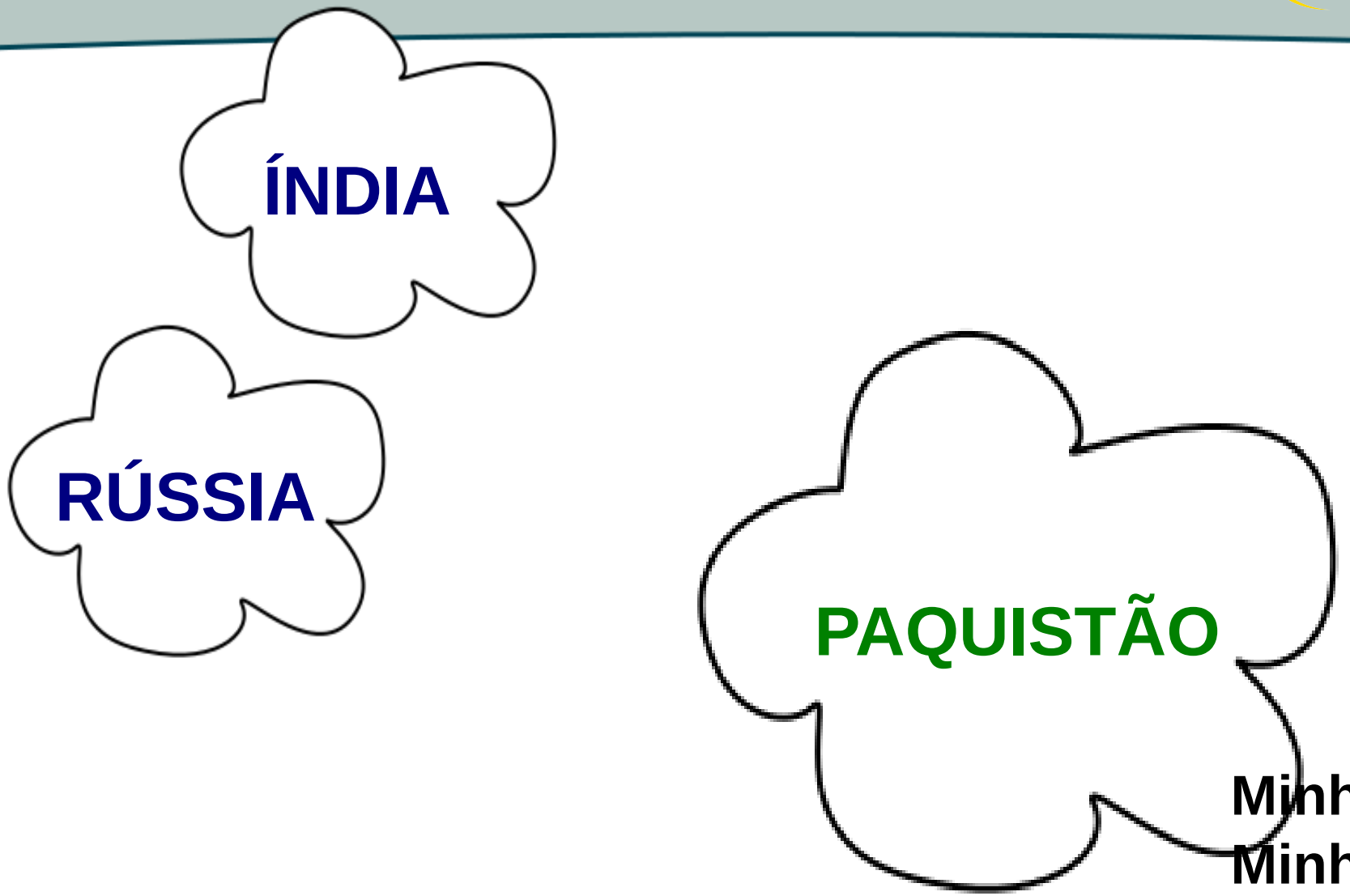
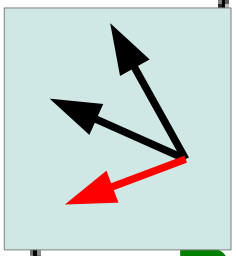


2 – Confiar no Roteamento Provedores?

ÍNDIA

RÚSSIA



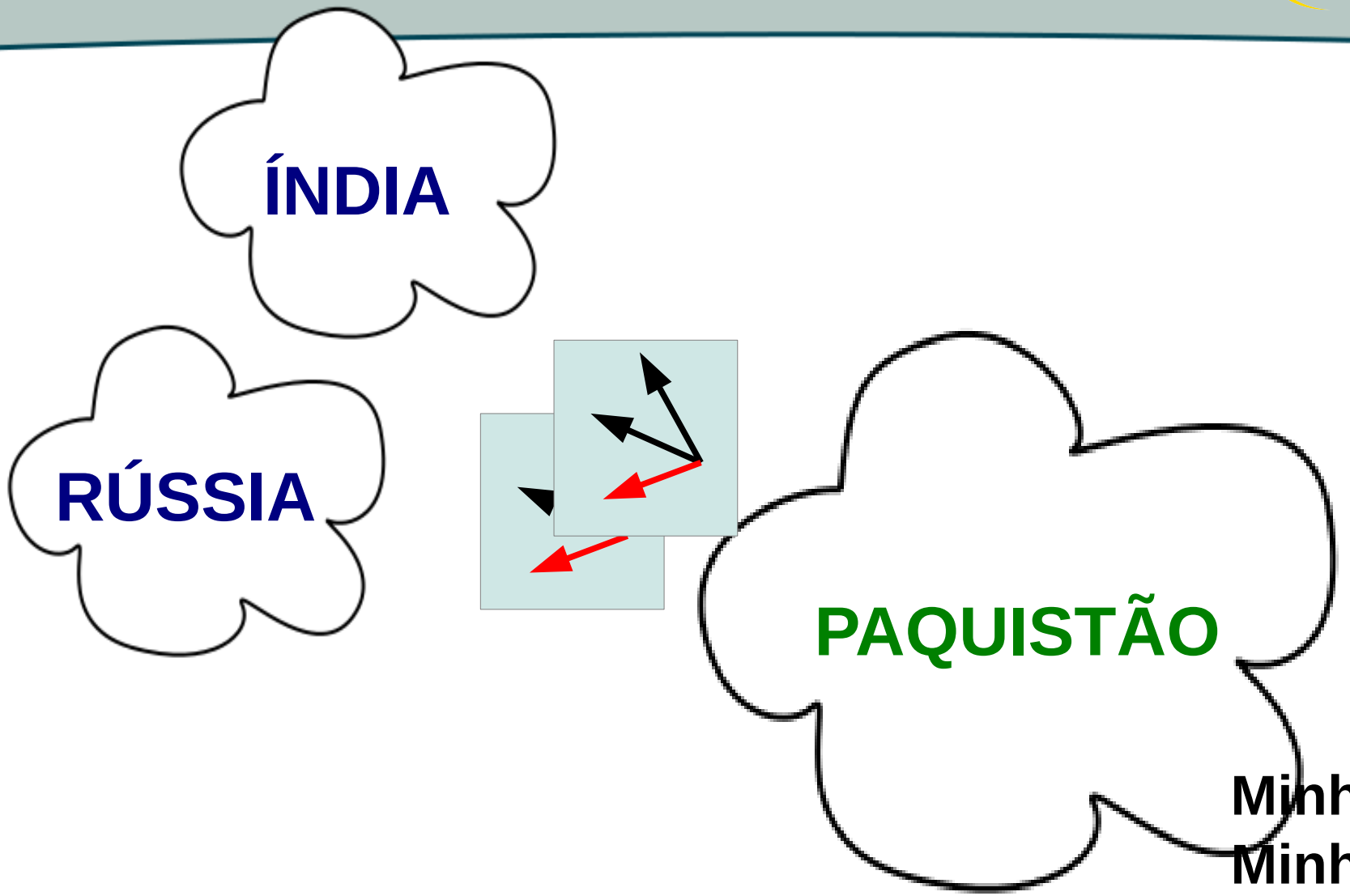
PAQUISTÃO

Minha rede A

Minha rede B

Minha rede Y (youtube)

2 – Confiar no Roteamento Provedores?



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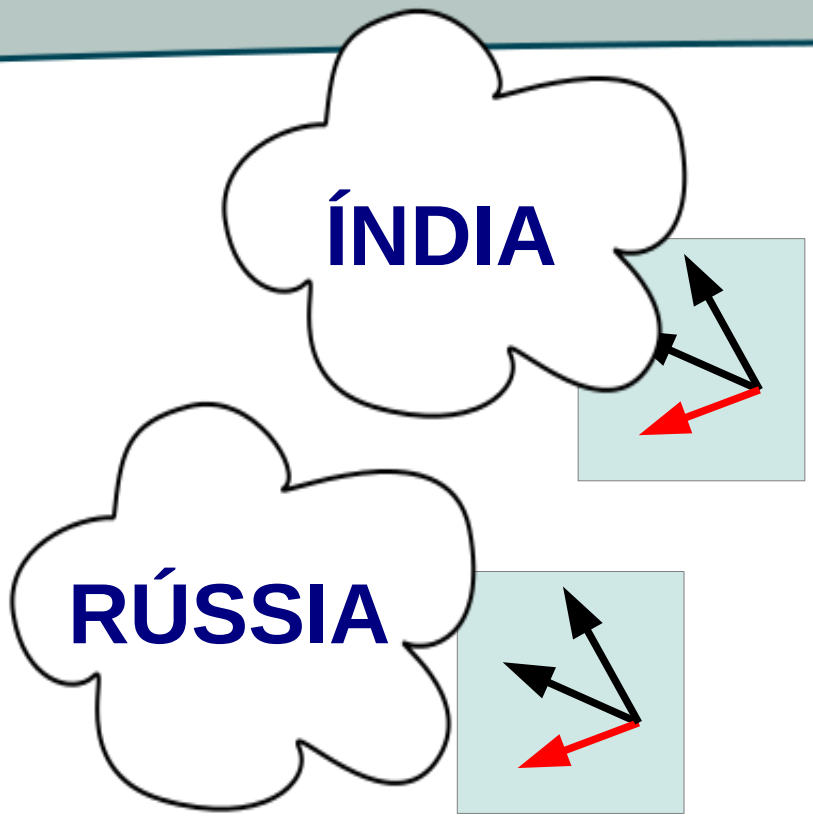

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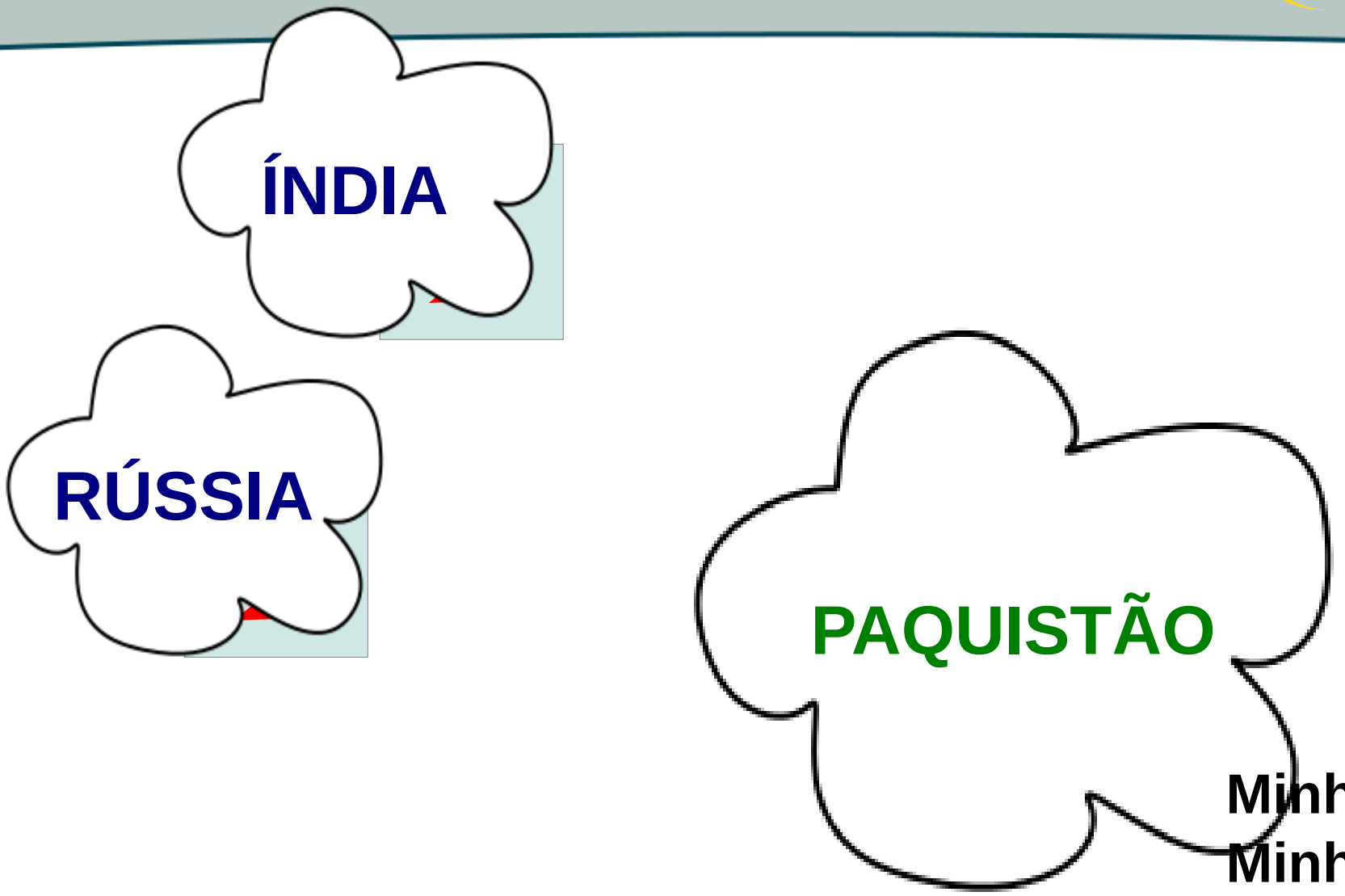

2 – Confiar no Roteamento Provedores?

ÍNDIA

RÚSSIA

PAQUISTÃO

www.youtube.com
IP 208....

Minha rede A
Minha rede B
Minha rede Y (youtube)

2 – Confiar no Roteamento Provedores?

ÍNDIA

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Minha rede A
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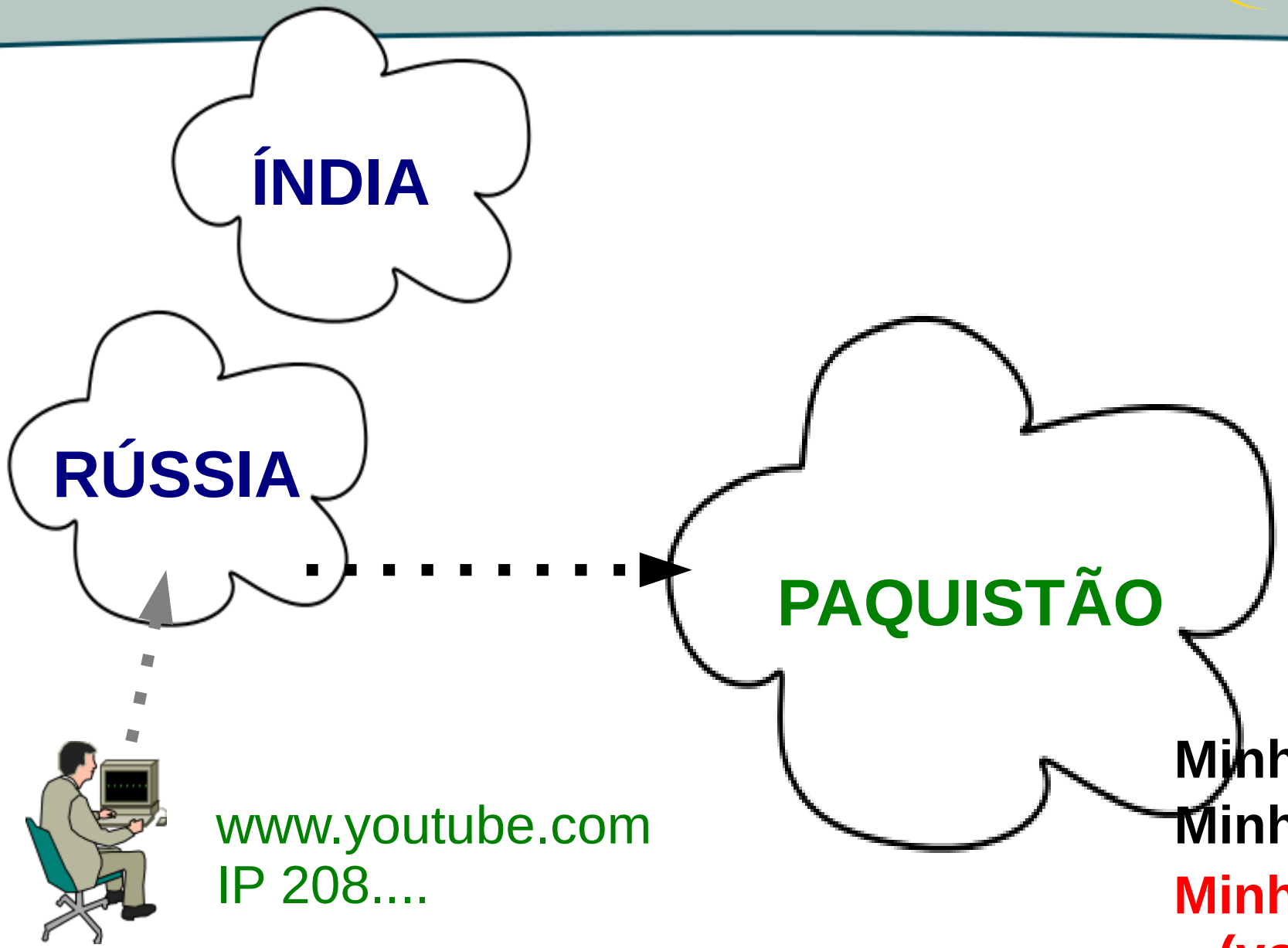

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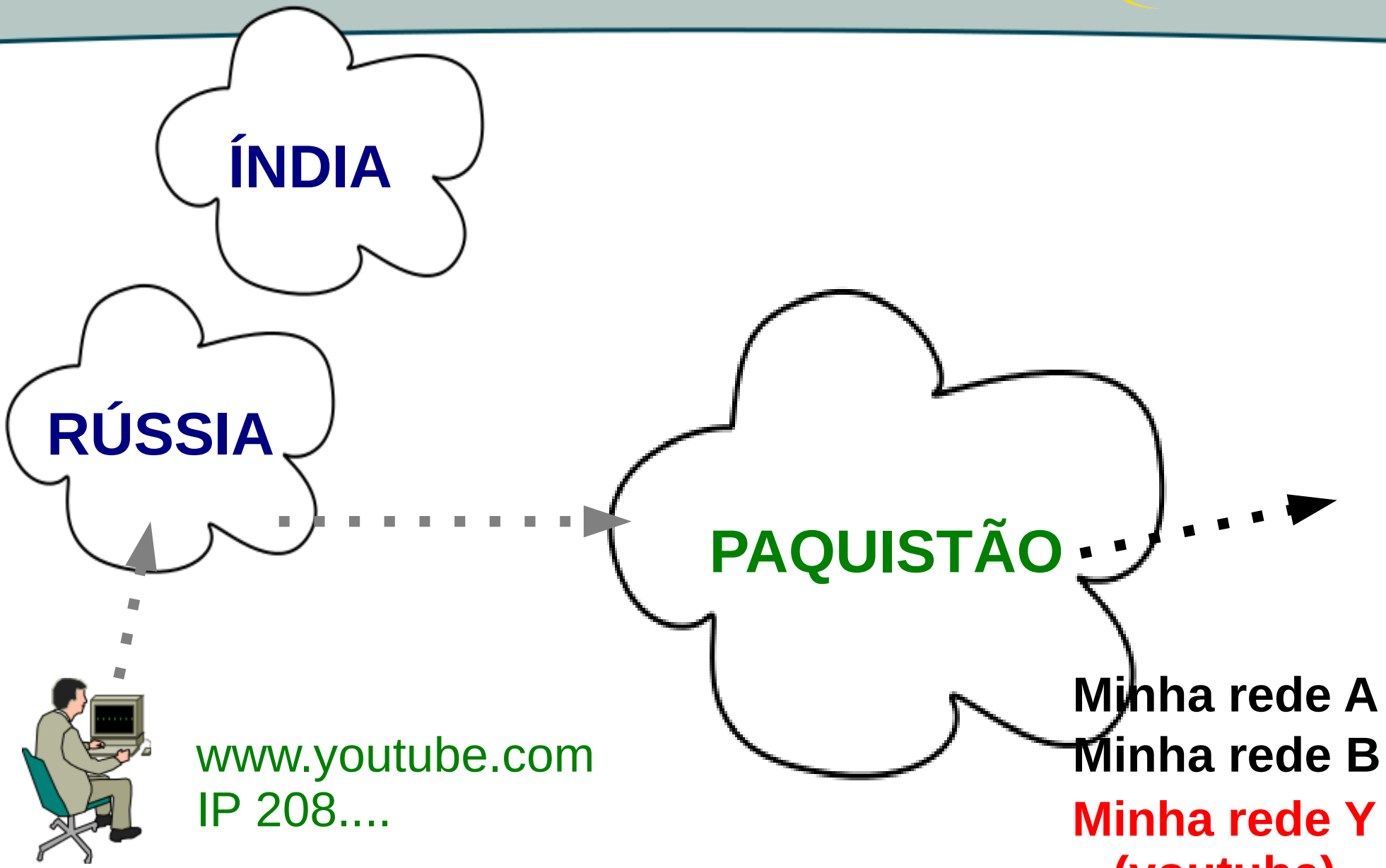

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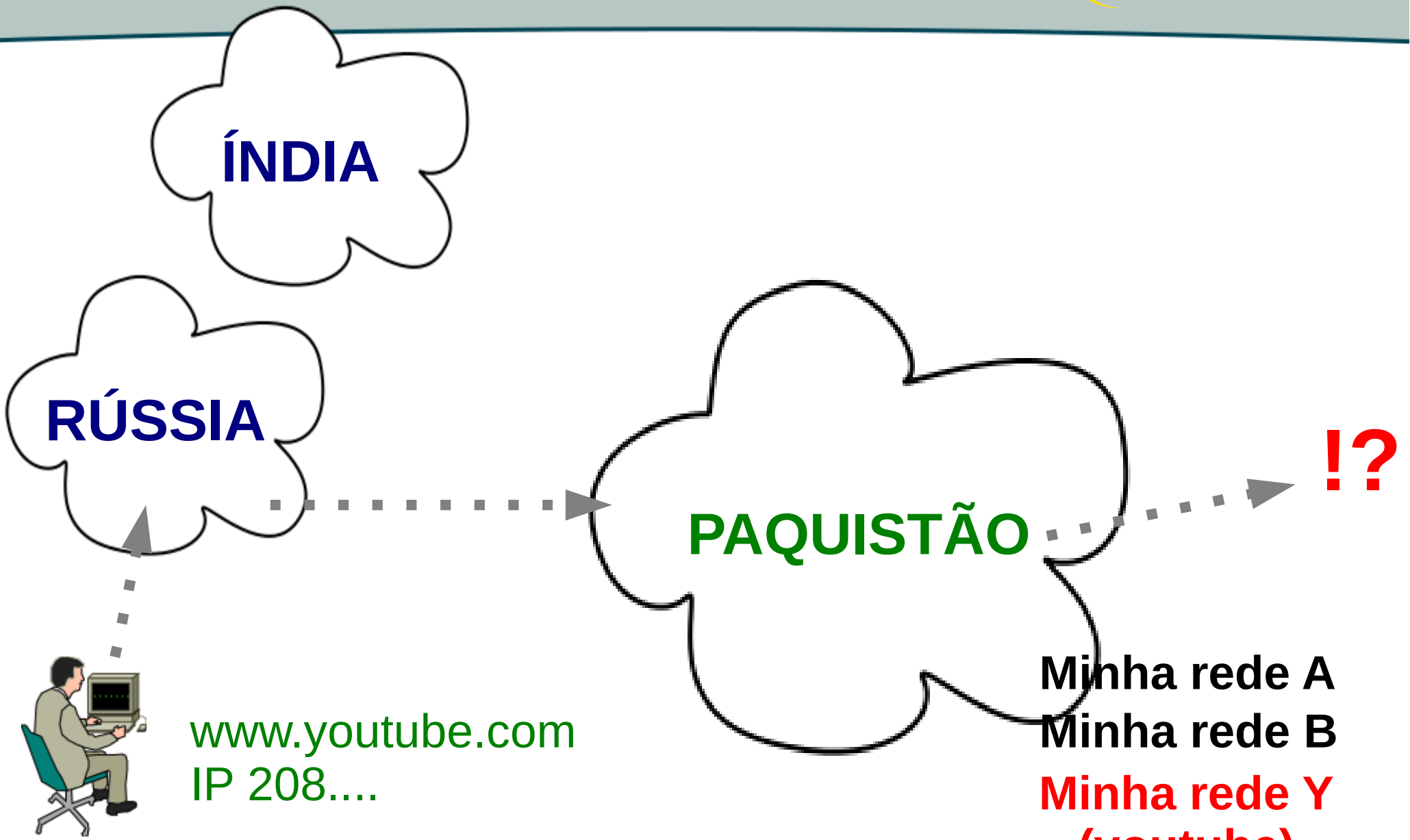


2 – Confiar no Roteamento Provedores?

INCIDENTE DE SEGURANÇA

Em 2008 provedor paquistanês
divulga rede do Youtube!

Em abril de 2010 provedor chinês
diversas redes sequestradas,
Ex: dell.com, cnn.com …


FRIDAY, APRIL 9, 2010

Chinese ISP hijacks the Internet

"This morning many BGPmon.net users received an alert

2 – Confiar no Roteamento Provedores?

CELEPAR INFORMÁTICA do PARANÁ

MAIS INCIDENTES

Google x Venezuela – Mar/2014

Google x Turquia
Mar/2014

2 – Confiar no Roteamento Provedores?

SOLUÇÃO

- Boas práticas
- Recursos BGP (filtros, cripto)
- Acerto entre ASs
- Basta ?!

UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ

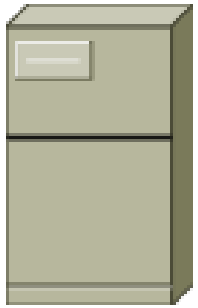
3 -

Podemos confiar em Autoridades Certificadoras?

3 – Confiar Autoridades Certificadoras?

Internauta

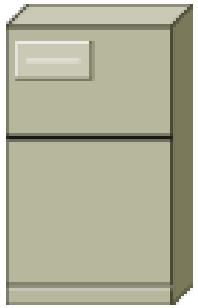
Servidor Web



3 – Confiar Autoridades Certificadoras?

Internauta

Servidor Web



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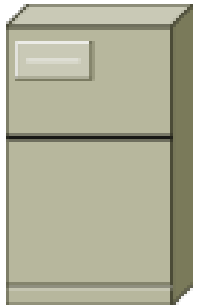

HTTP

Texto Aberto

3 – Confiar Autoridades Certificadoras?

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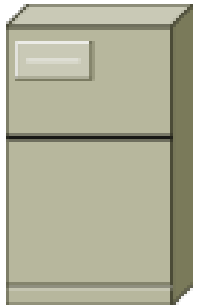

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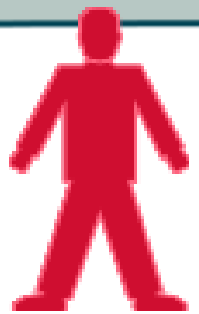

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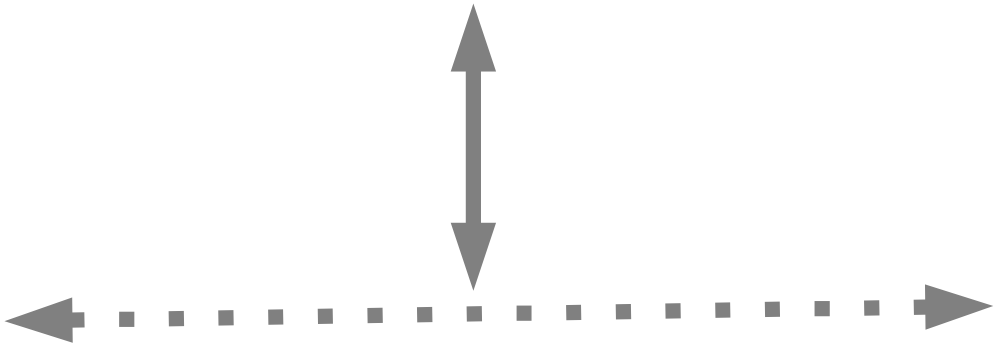

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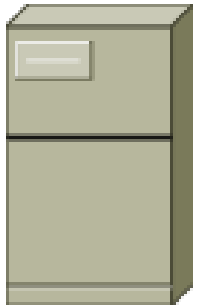

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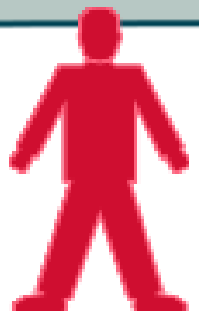

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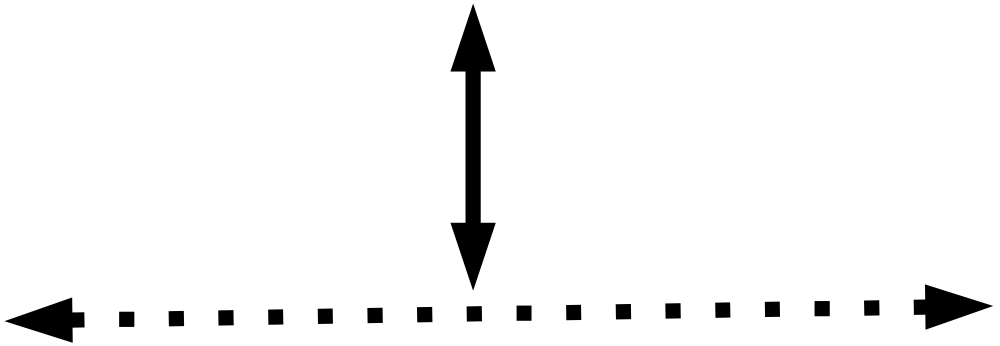

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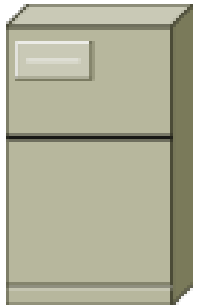

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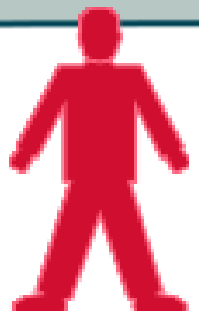
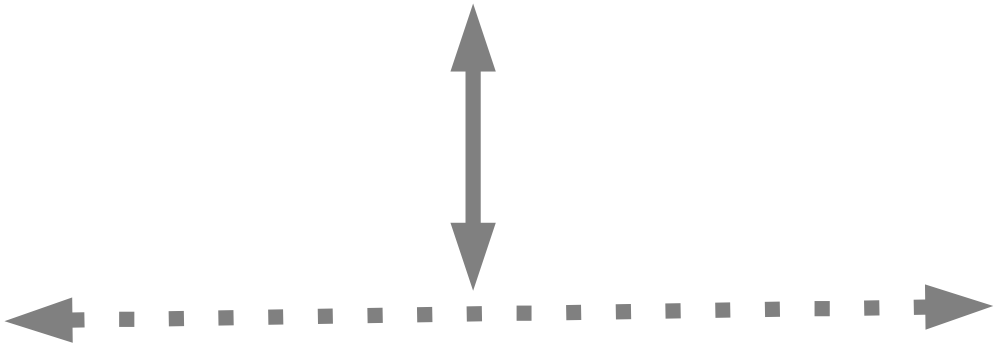


Posso ver o tráfego!

Internauta



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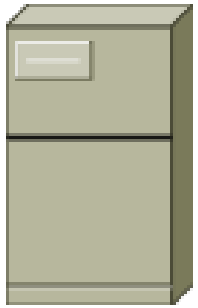

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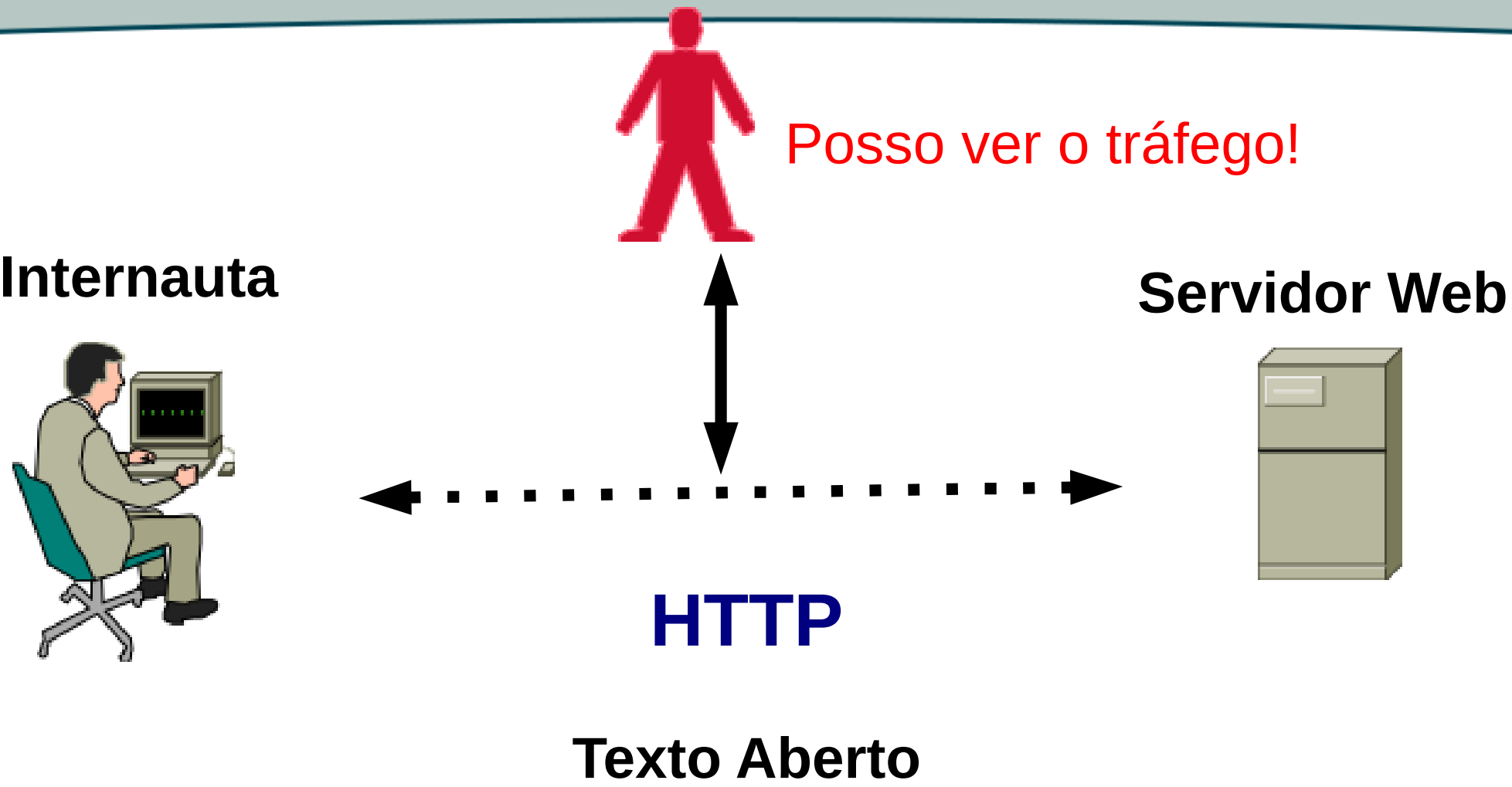

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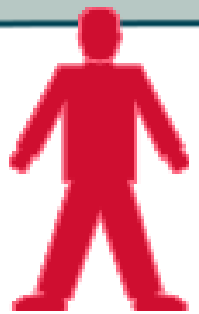

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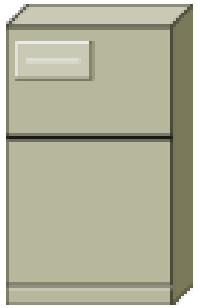

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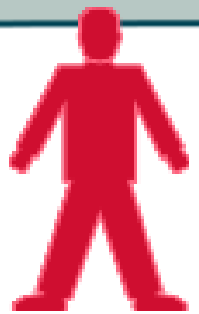

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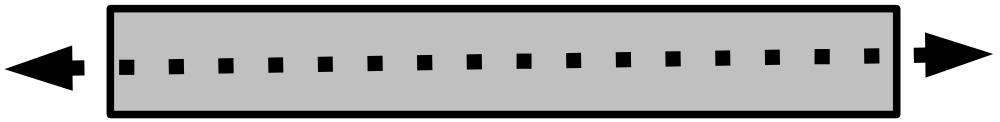

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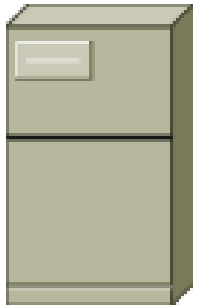

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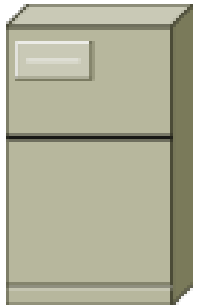

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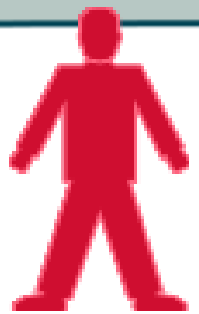

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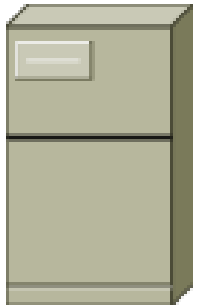

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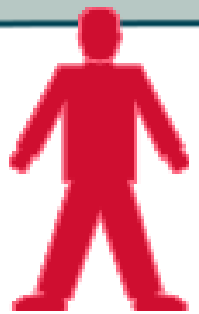

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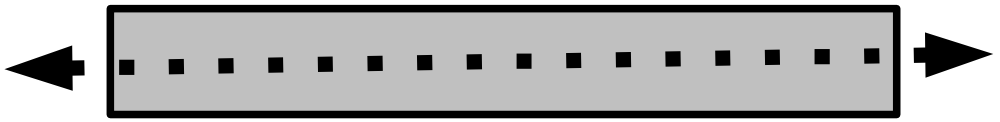

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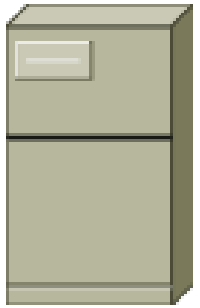

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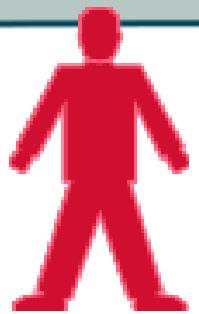

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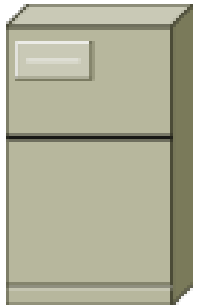

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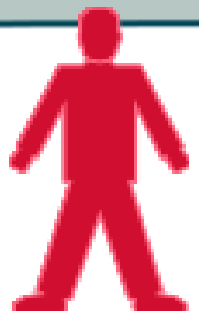

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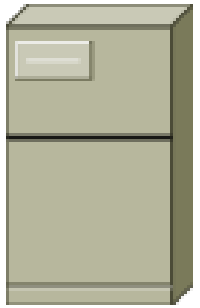

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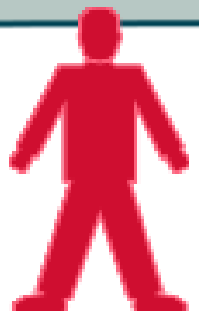

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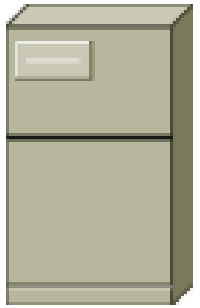

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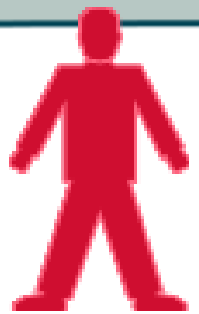

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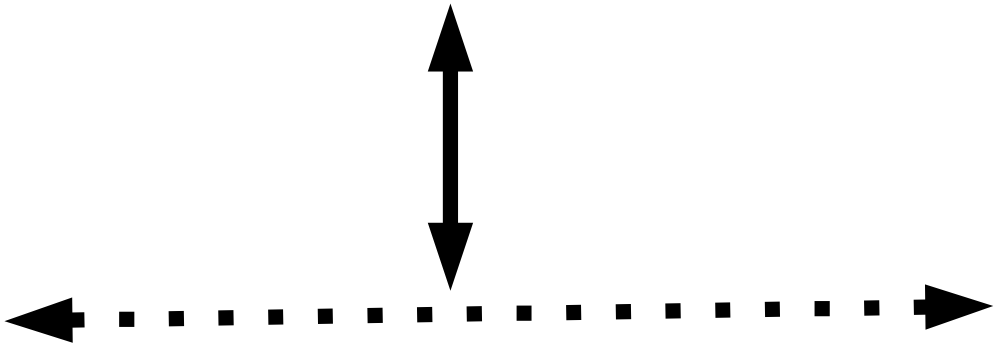

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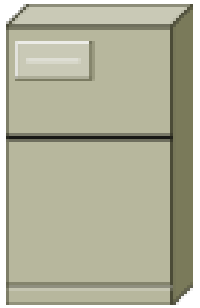

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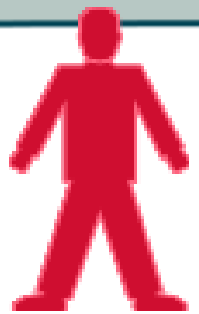

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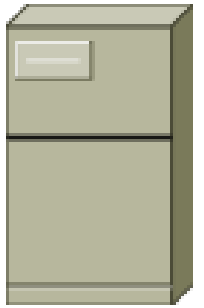

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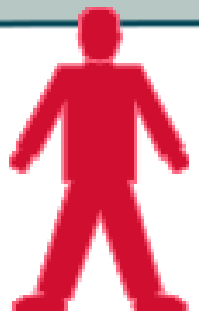

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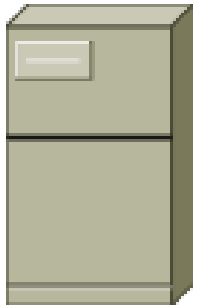

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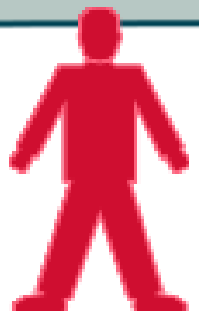

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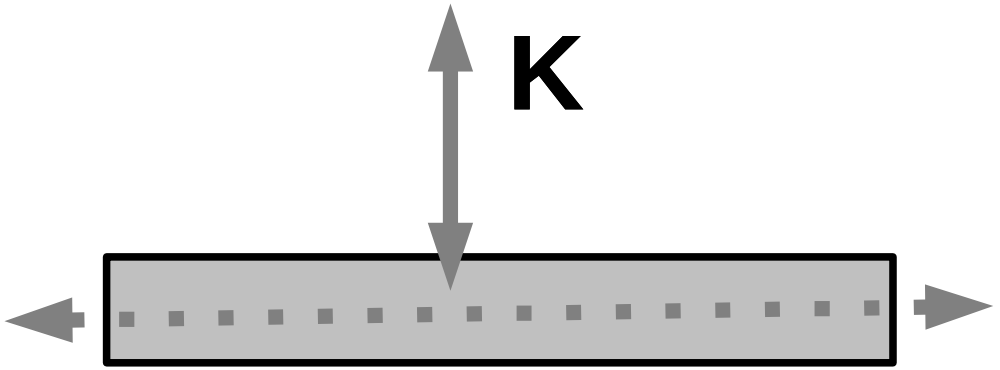

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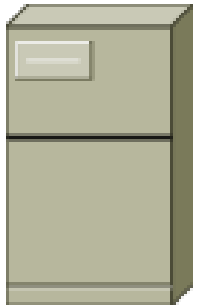

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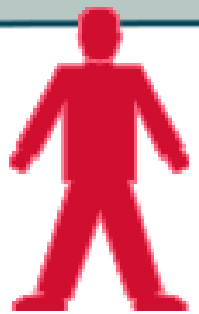

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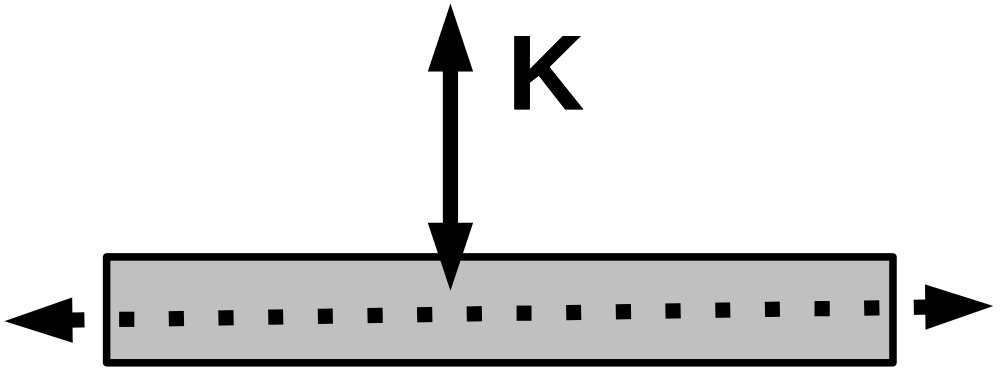

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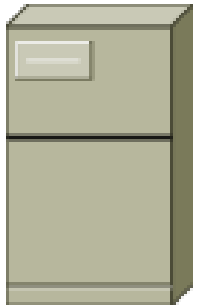

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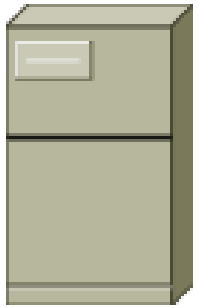

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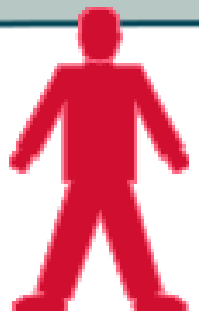

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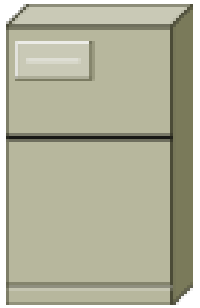

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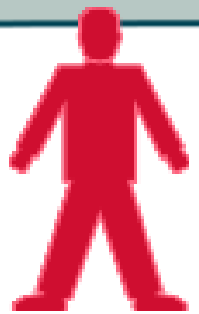

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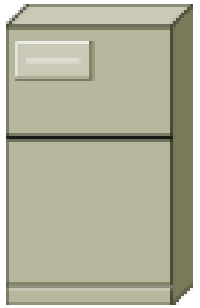

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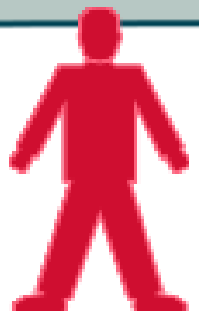

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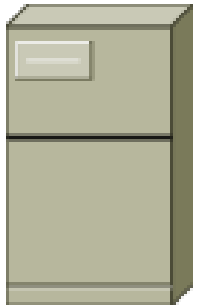

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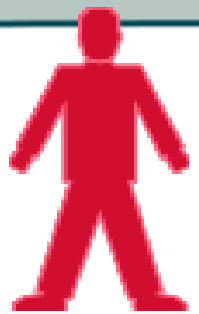

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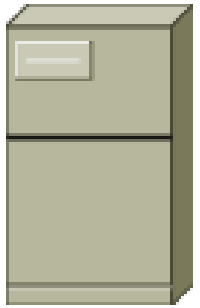

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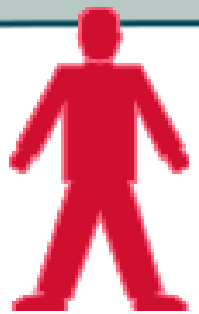

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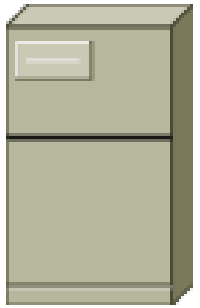

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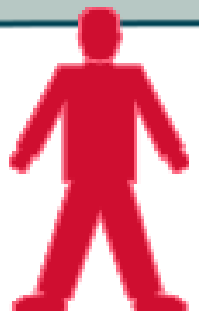

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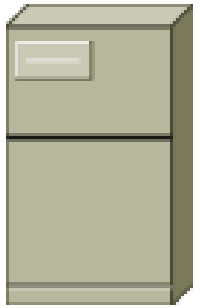

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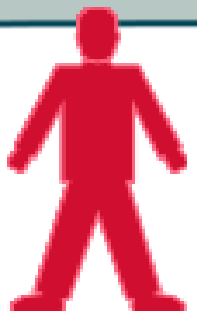

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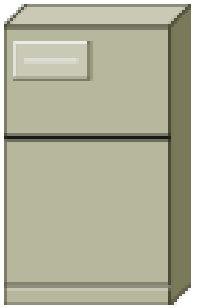

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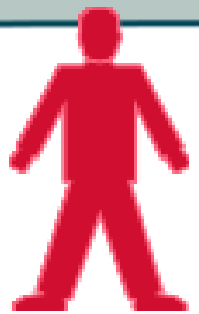

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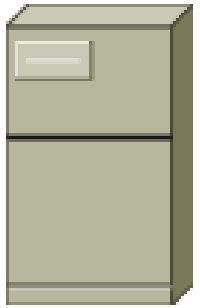

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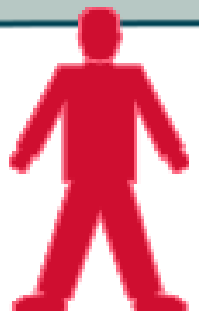

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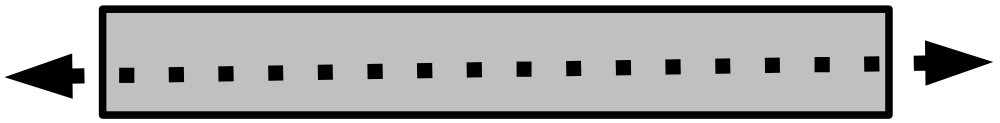

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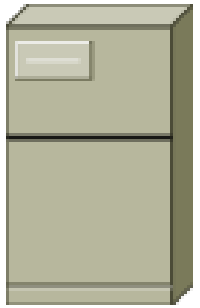

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Chave Secreta Criptografada

Dados Criptografados

3 – Confiar Autoridades Certificadoras?

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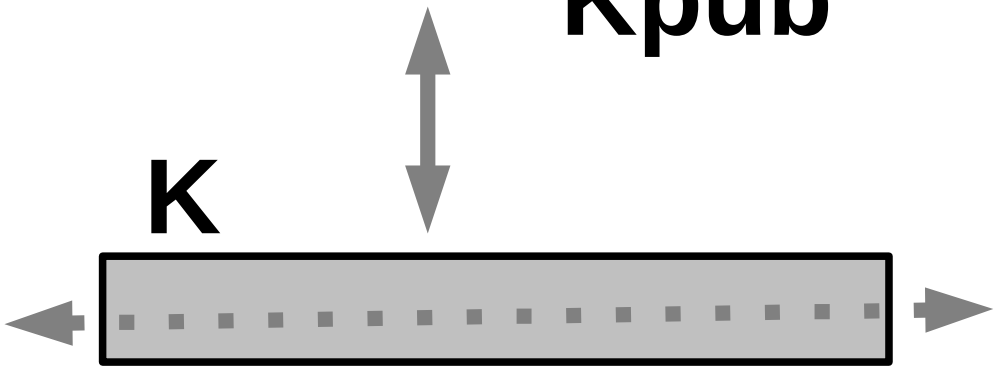

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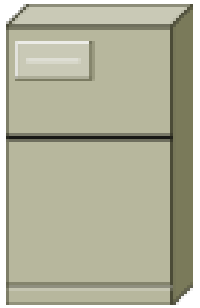

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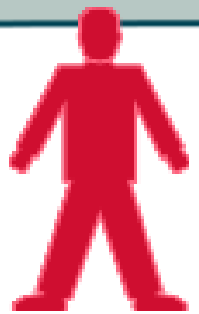

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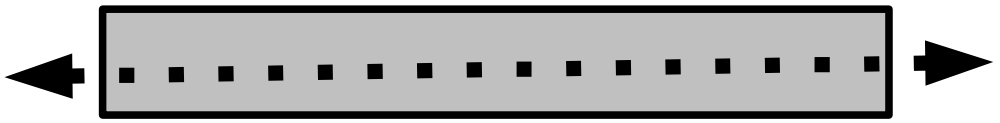

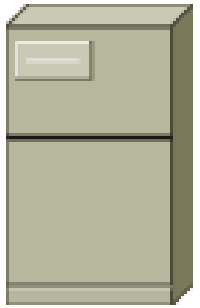

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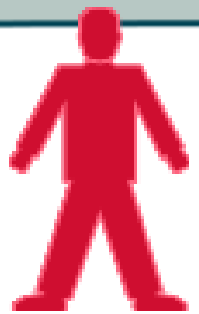

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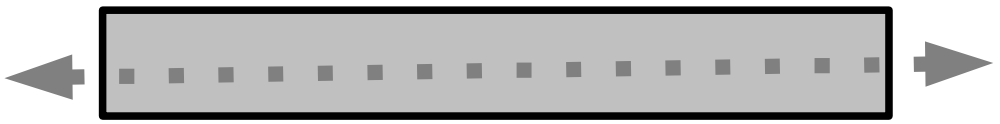

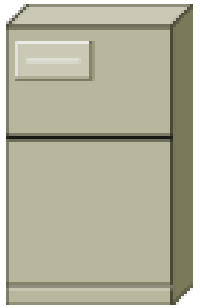

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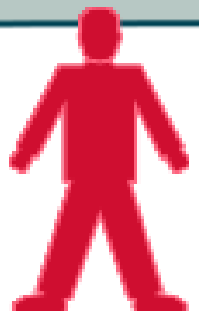

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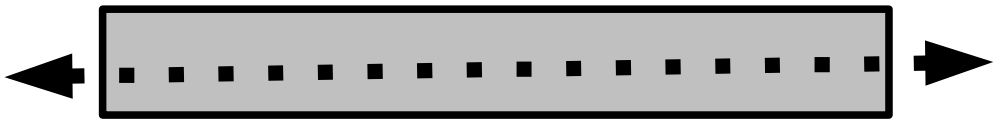

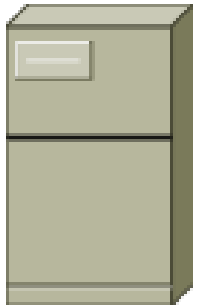

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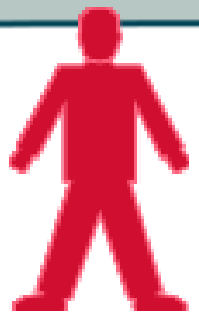

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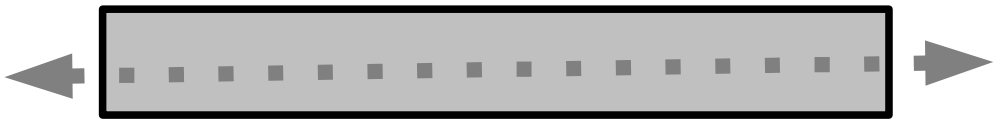

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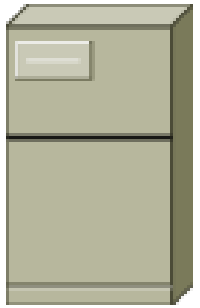

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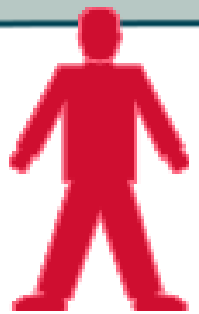

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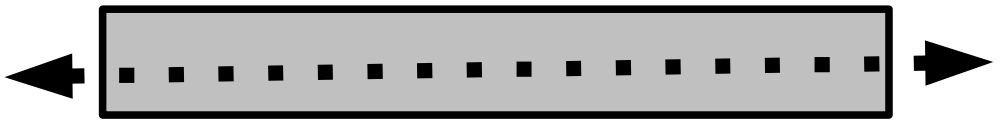

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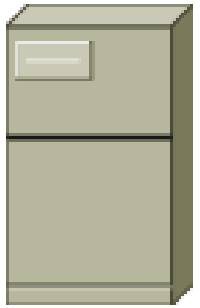

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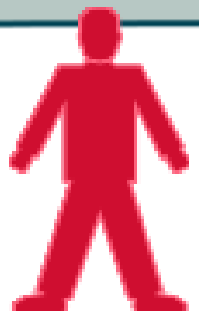

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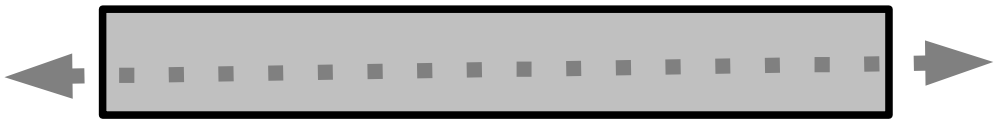

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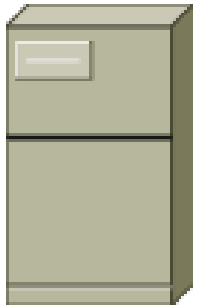

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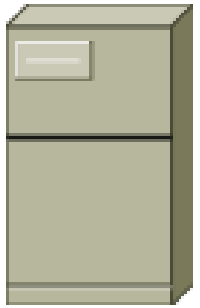
3 – Confiar Autoridades Certificadoras?

Internauta

Protocolo SSL

Netscape
(1994)

Servidor Web



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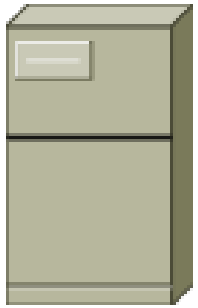
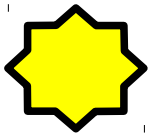


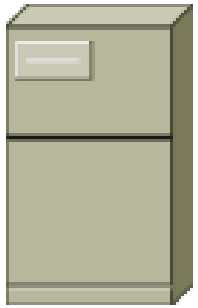


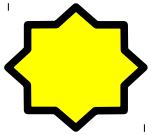
CERTIFICADO DIGITAL

3 – Confiar Autoridades Certificadoras?

Internauta

Servidor Web





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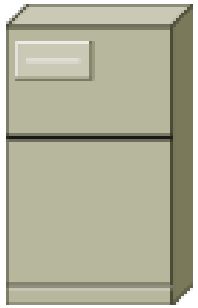

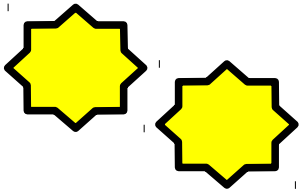

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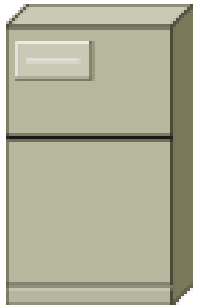

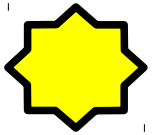

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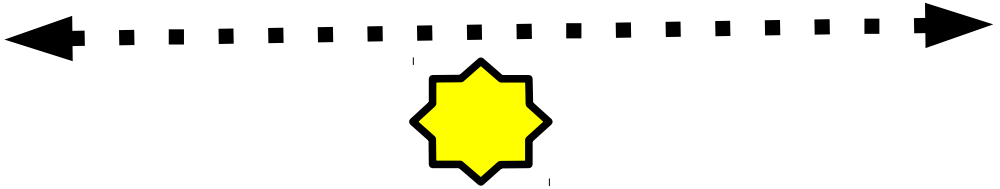

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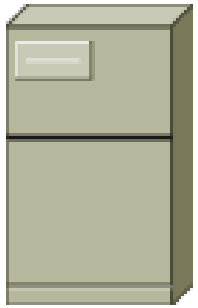

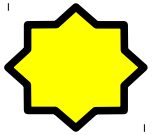

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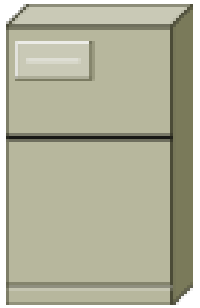

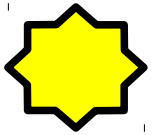

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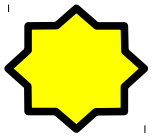

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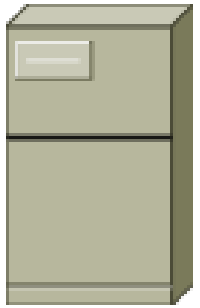

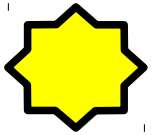

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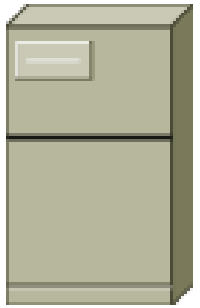

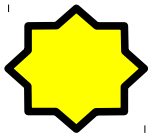

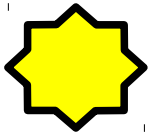

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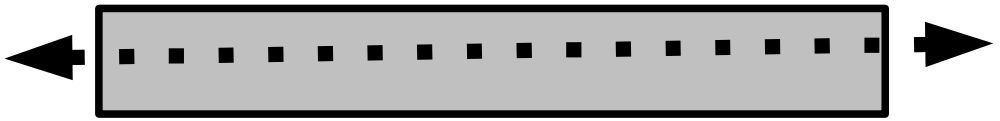

HTTP + SSL

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HTTPS

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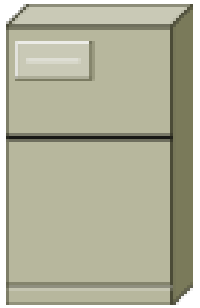

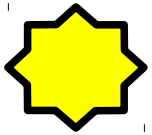

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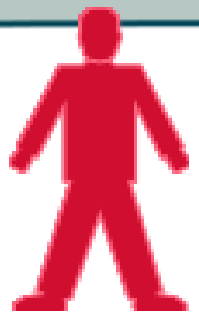

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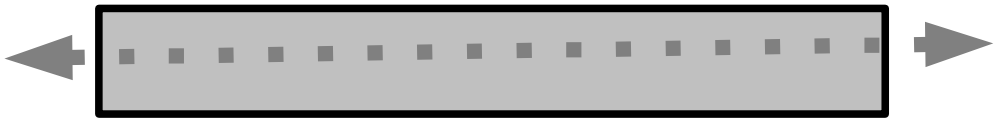

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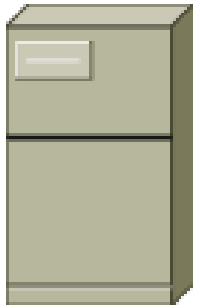

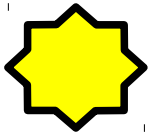

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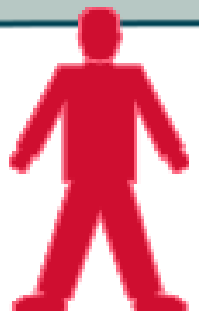

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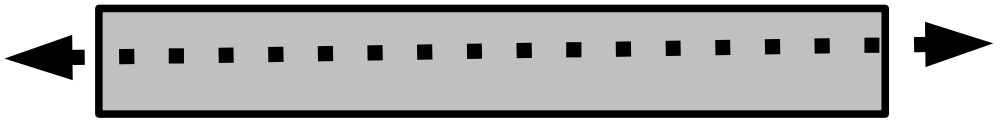

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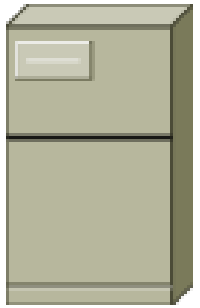
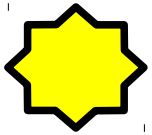


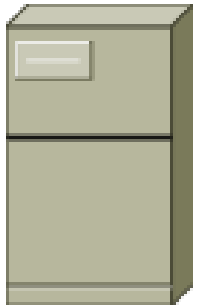


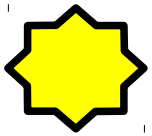
CERTIFICADO DIGITAL

3 – Confiar Autoridades Certificadoras?

Internauta

Servidor Web





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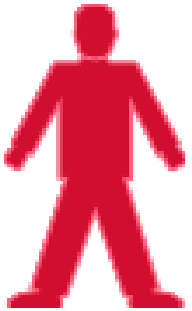
Atacante



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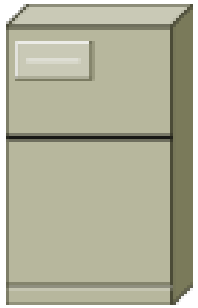

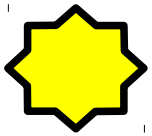

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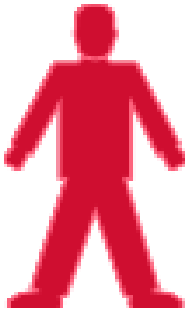

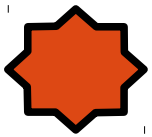

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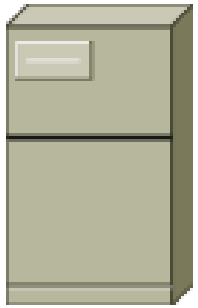

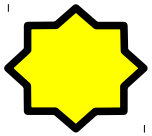

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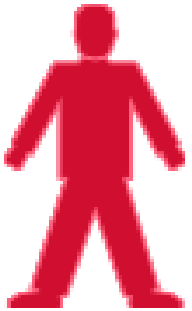

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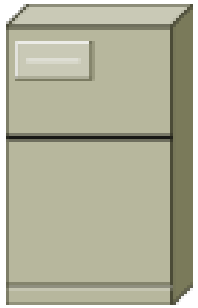

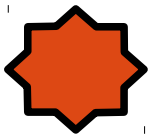

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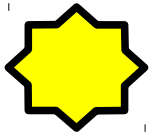

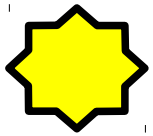

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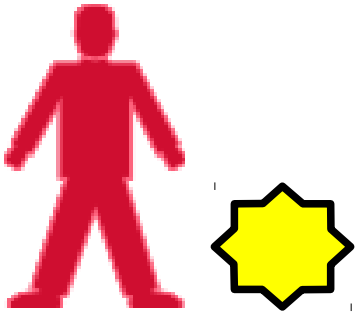

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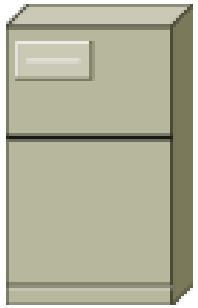

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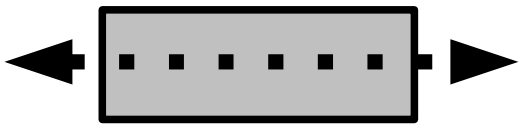

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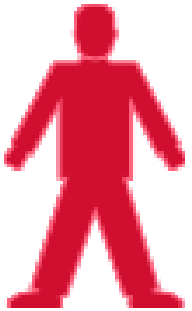

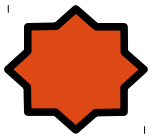

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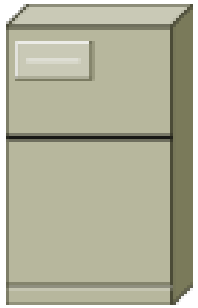

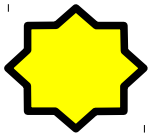

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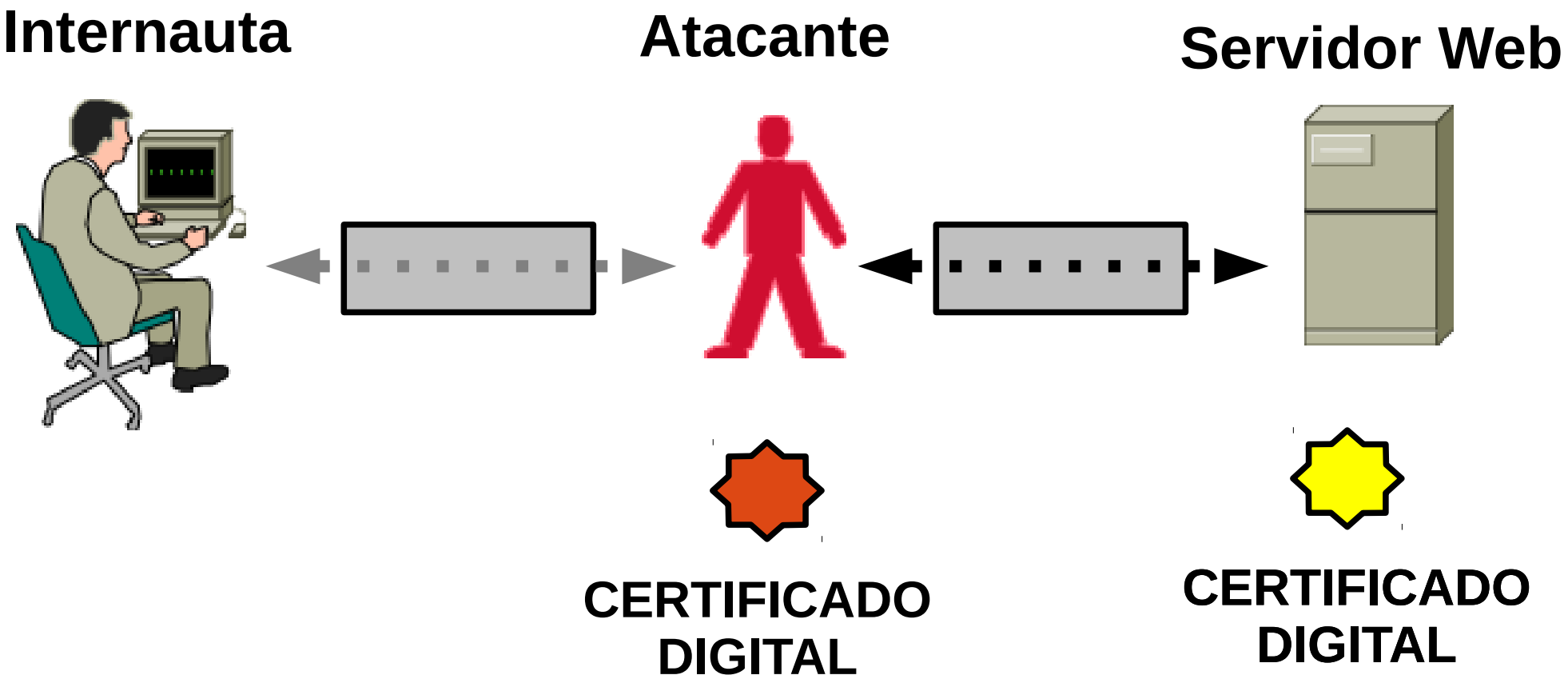
3 – Confiar Autoridades Certificadoras?

Ataque do Homem Intermediário



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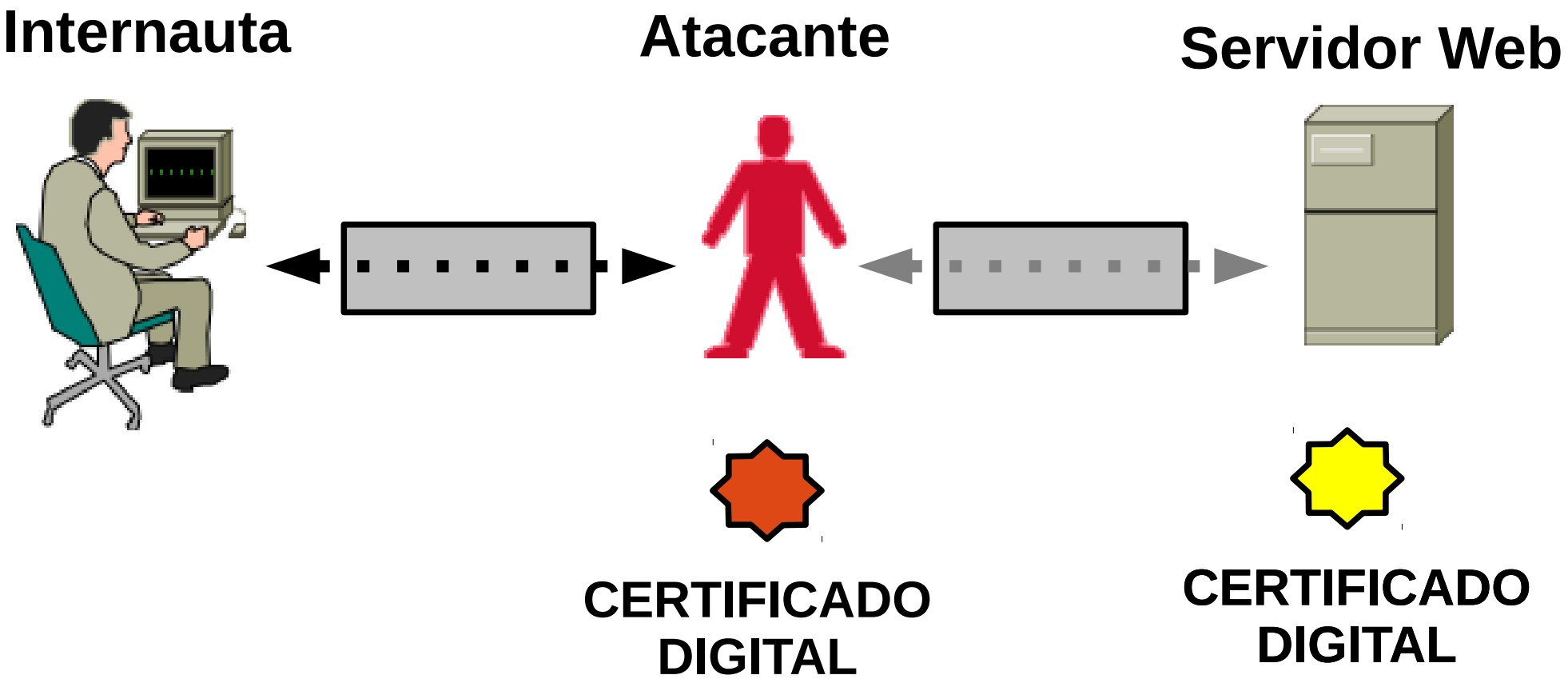
Ataque do Homem Intermediário



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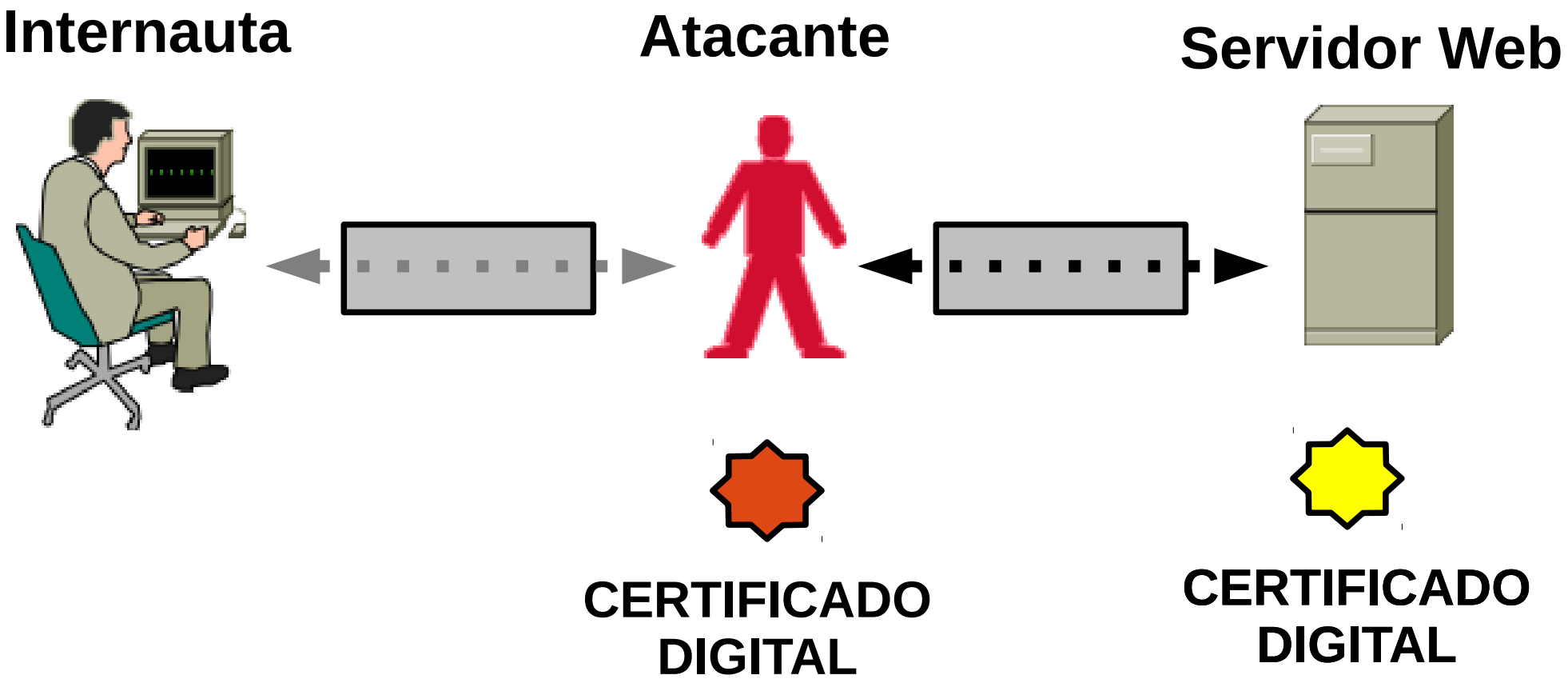
Ataque do Homem Intermediário



3 – Confiar Autoridades Certificadoras?

CELEPAR INFORMÁTICA do PARANÁ

Incidente de Segurança

China
MITM+SSL

GitHub
Jan/2013

Google
Set/2014

Yahoo
Out/2014

Ongoing MITM attack against Yahoo in China confirmed, Chinese Government accused of intercepting traffic

BY SEVAN MAKARACI · OCTOBER 4, 2014

Is it possible to block some search engine queries without blocking the entire website? The answer is yes and it appears that for this very reason there was an ongoing man-in-the-middle (MITM) attack against Yahoo in China. The online censorship monitoring organisation GreatFire sent out a tweet on September 30th saying that "Yahoo appears to under Man-in-the-middle attack in China. 3rd case of country-wide MITM, after Google, Github"

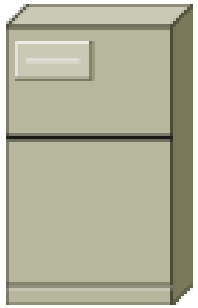
3 – Confiar Autoridades Certificadoras?

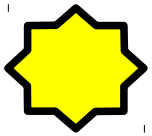
Solução:

Autoridade Certificadora

Internauta

Servidor Web





CERTIFICADO DIGITAL

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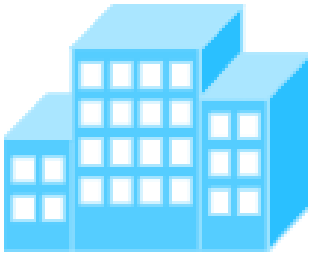

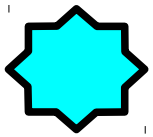

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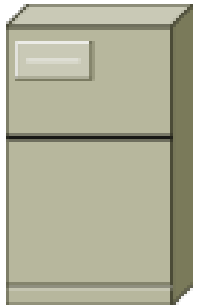

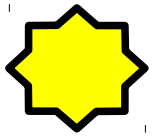

CERTIFICADO DIGITAL

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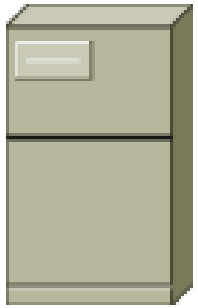
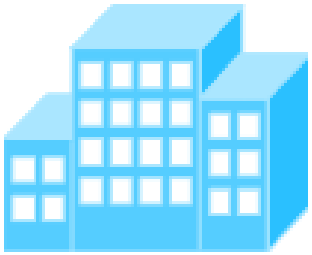
Servidor Web





CERTIFICADO DIGITAL AUTORIDADE

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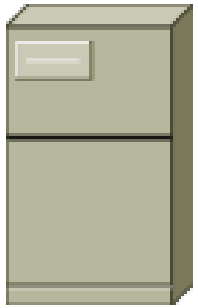

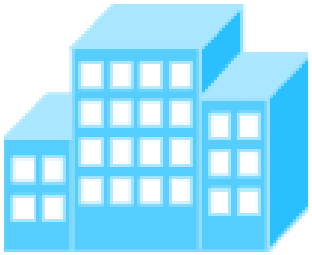

CERTIFICADO DIGITAL AUTORIDADE

CERTIFICADO DIGITAL VÁLIDO

3 – Confiar Autoridades Certificadoras?

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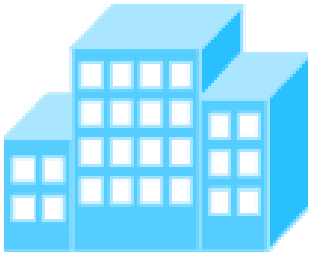

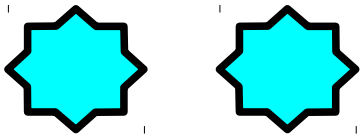

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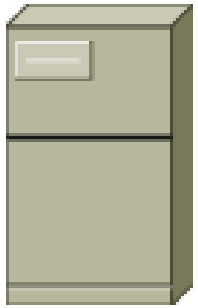

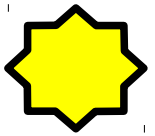

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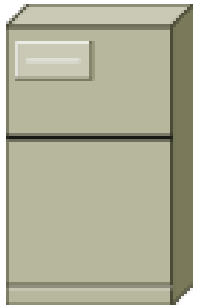

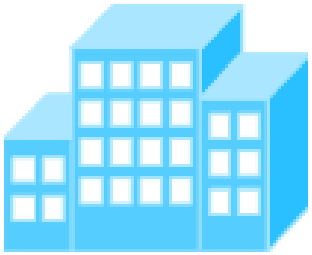

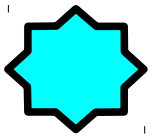

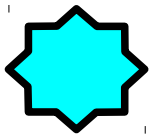

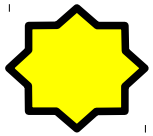

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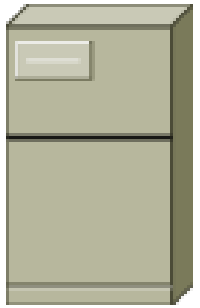

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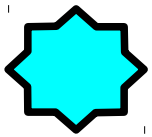

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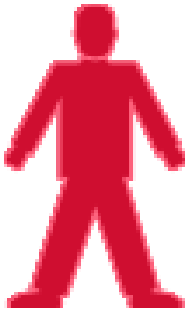

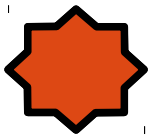

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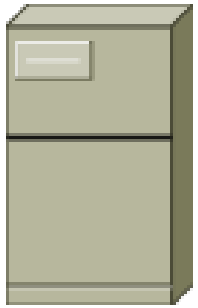

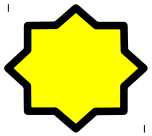

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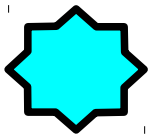

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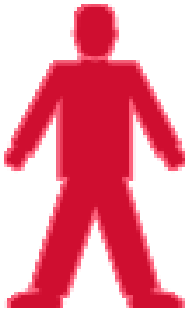

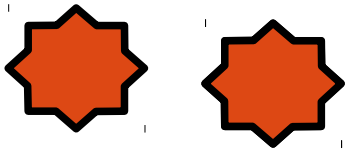

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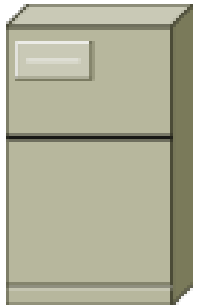
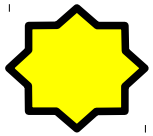


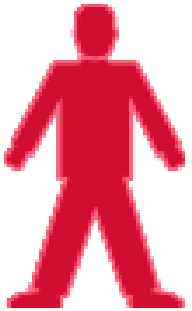


CERTIFICADO DIGITAL VÁLIDO

3 – Confiar Autoridades Certificadoras?

Internauta

Atacante



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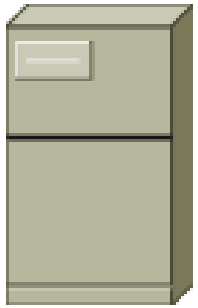

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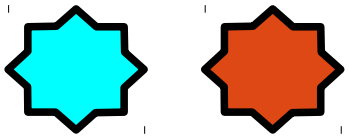

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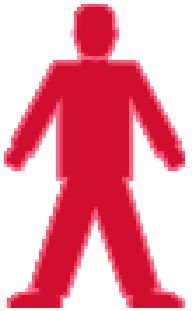

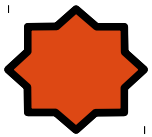

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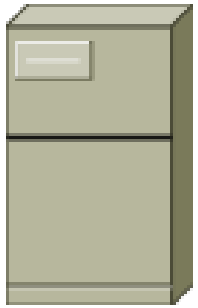

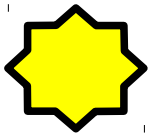

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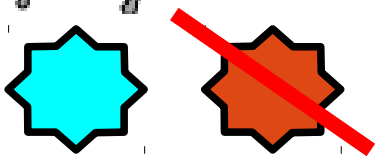

Não Aceito!
Certificado INVÁLIDO!

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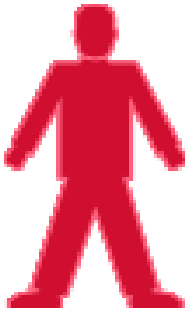

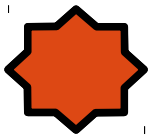

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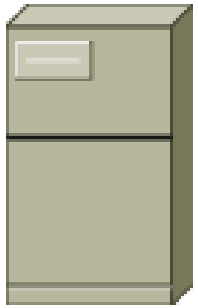

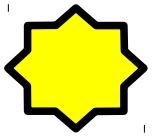

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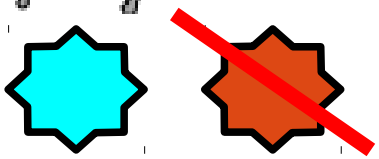

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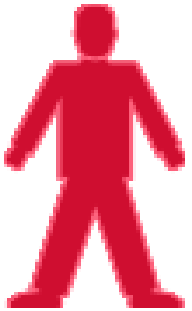

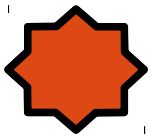

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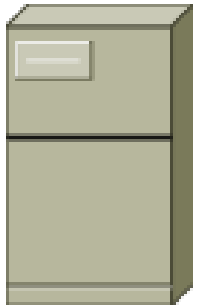

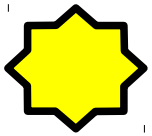

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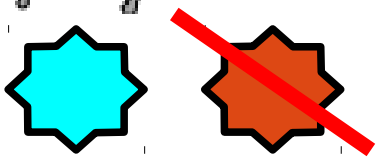

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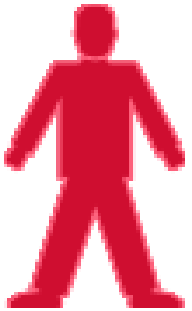

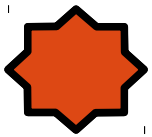

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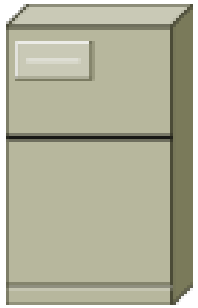

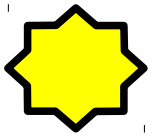

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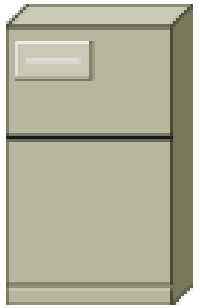

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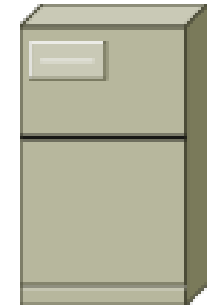

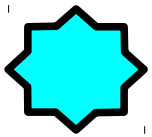

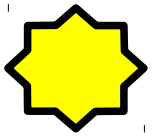

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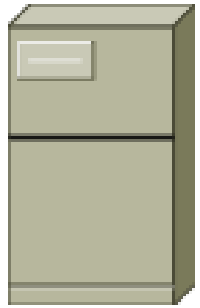

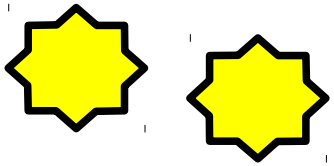

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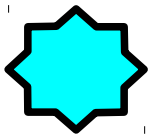

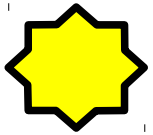

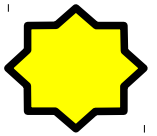

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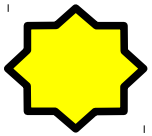

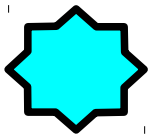

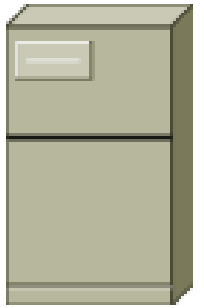

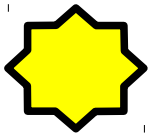

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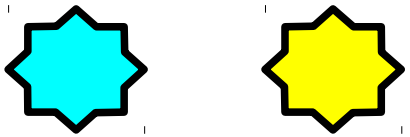

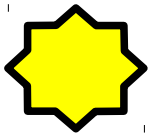

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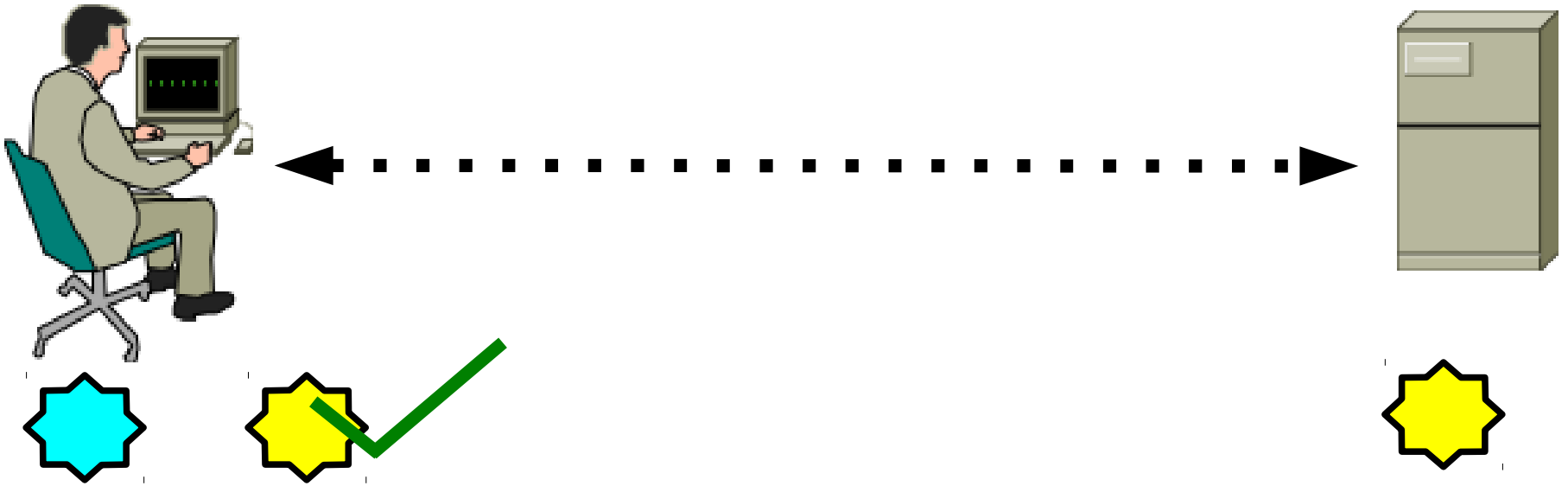

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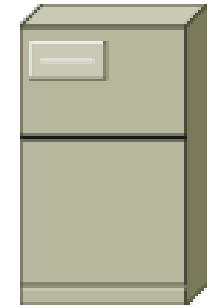

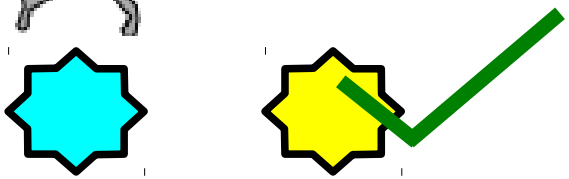

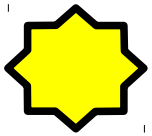

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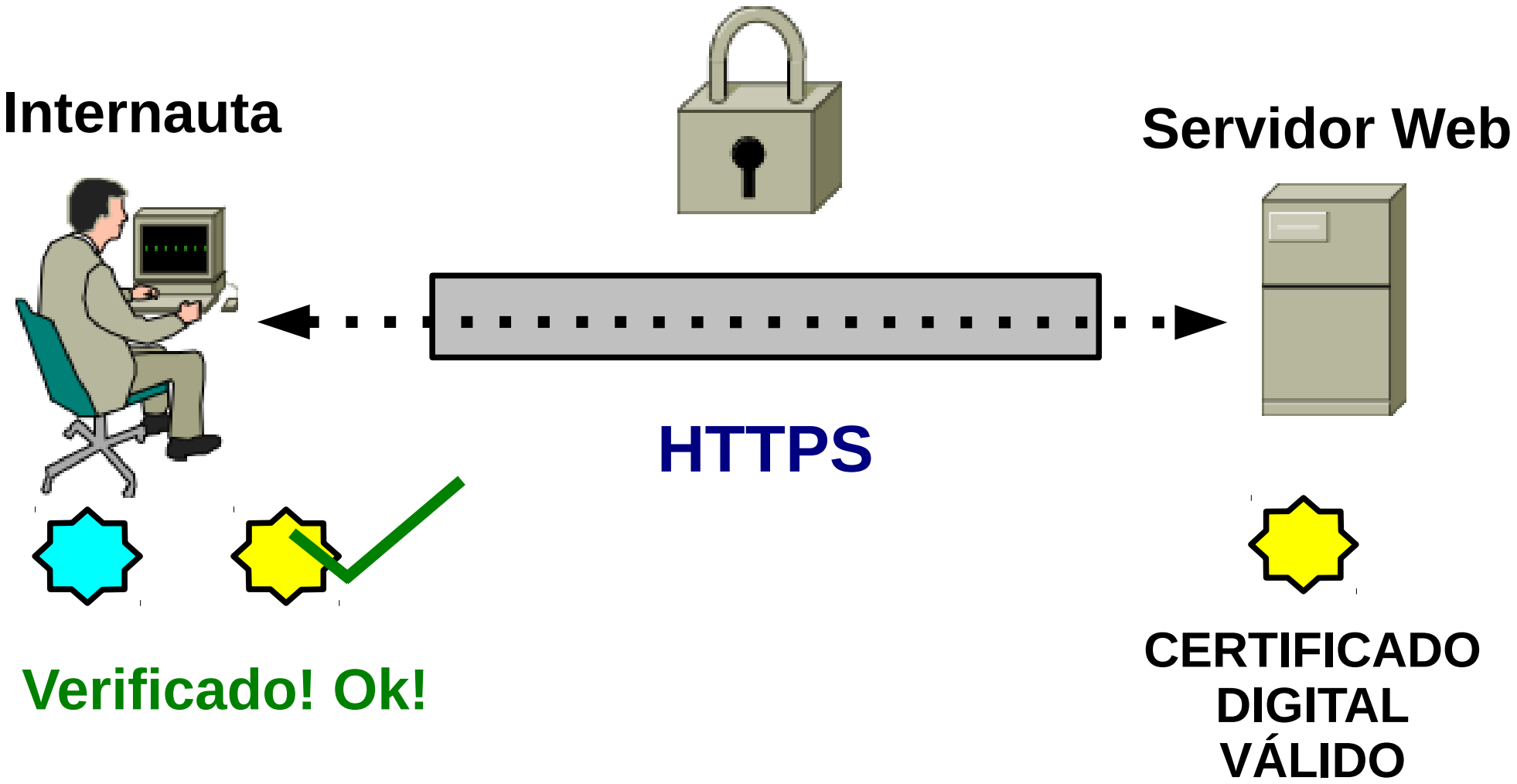

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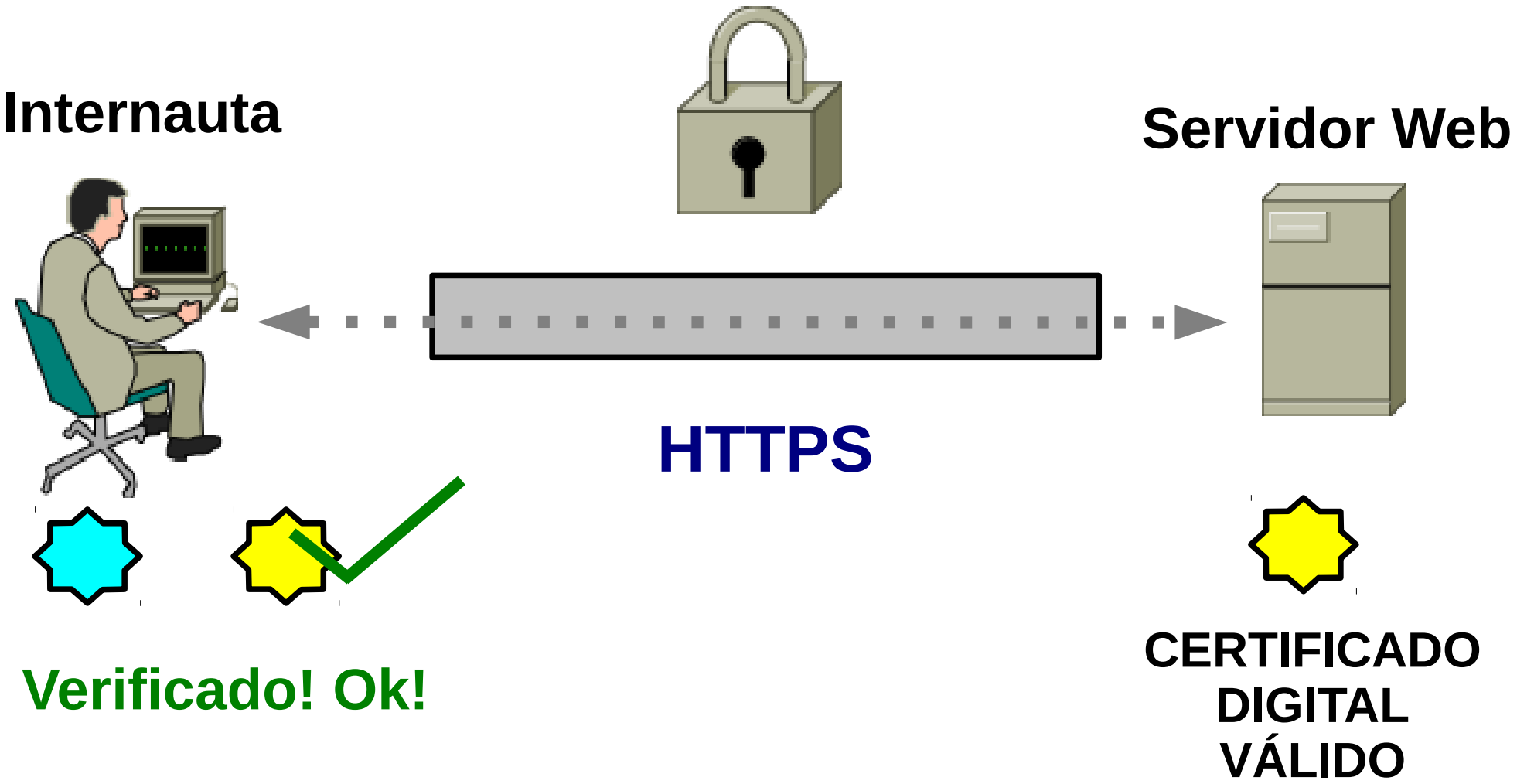

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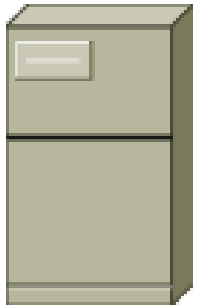

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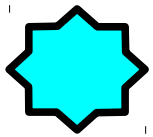
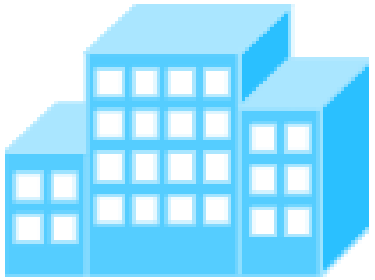
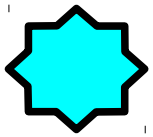
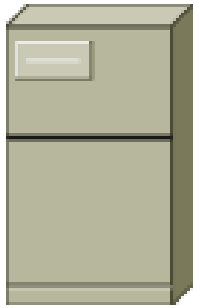






CERTIFICADO AUTORIDADE

Servidor Web do Atacante



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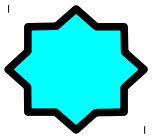

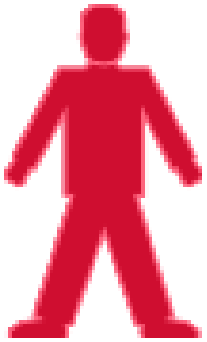

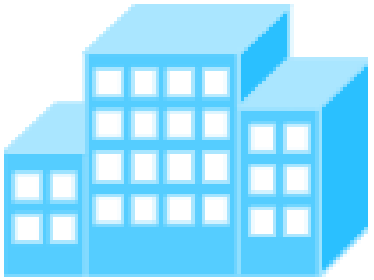

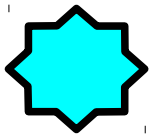

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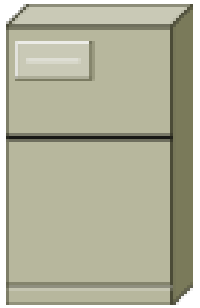

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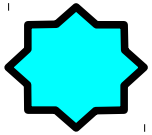
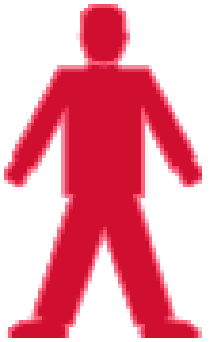
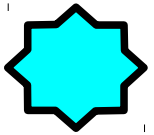
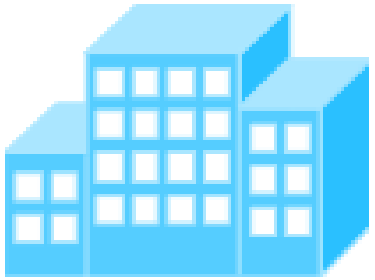
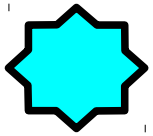




CERTIFICADO COMPROMETIDO

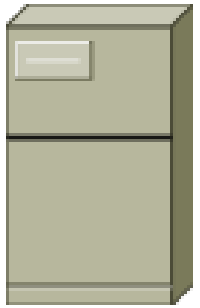






CERTIFICADO AUTORIDADE

Servidor Web do Atacante



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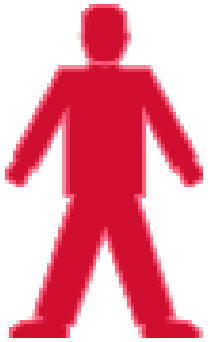

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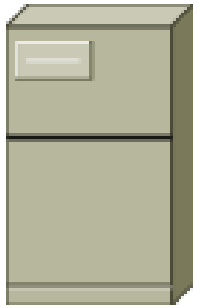

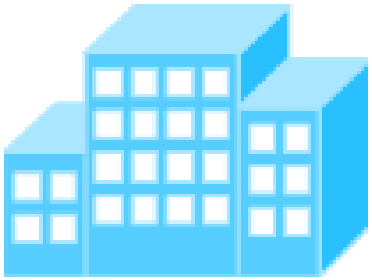

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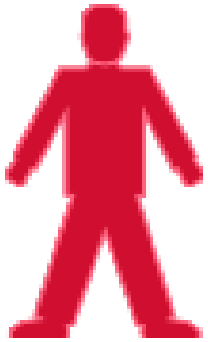

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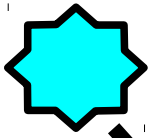

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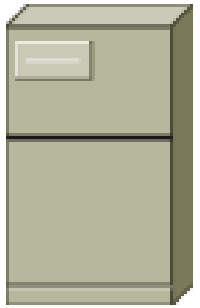

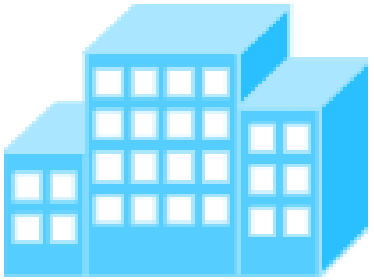

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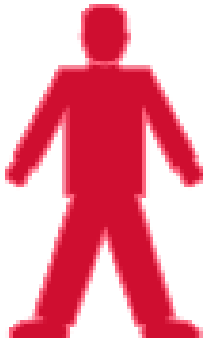

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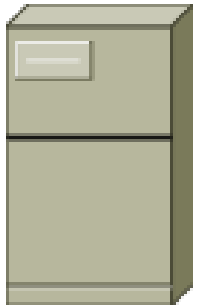

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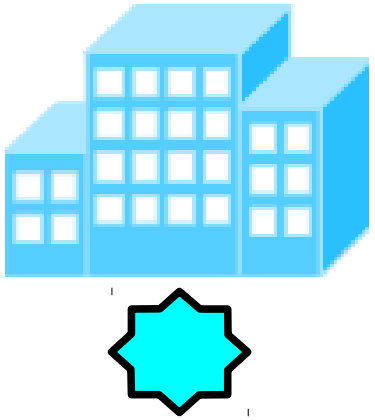

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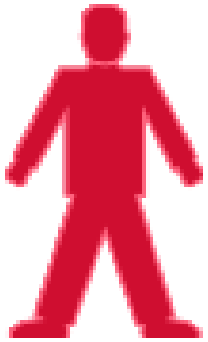

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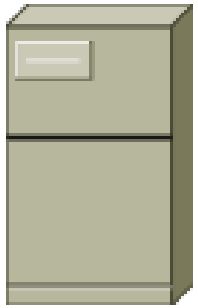

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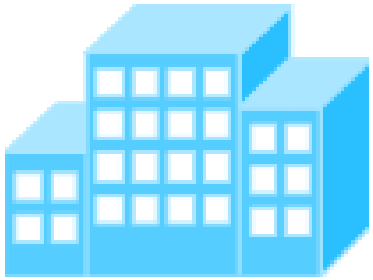

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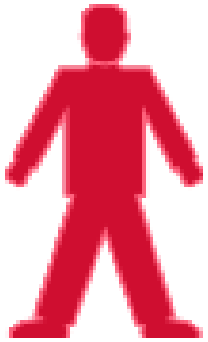

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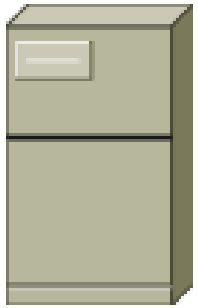

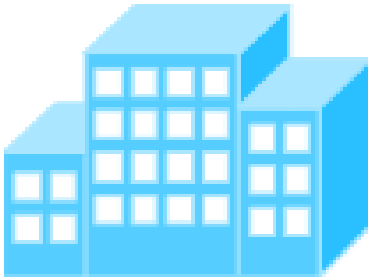

CERTIFICADO AUTORIDADE

CERTIFICADO DIGITAL VÁLIDO

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Servidor Web do Atacante

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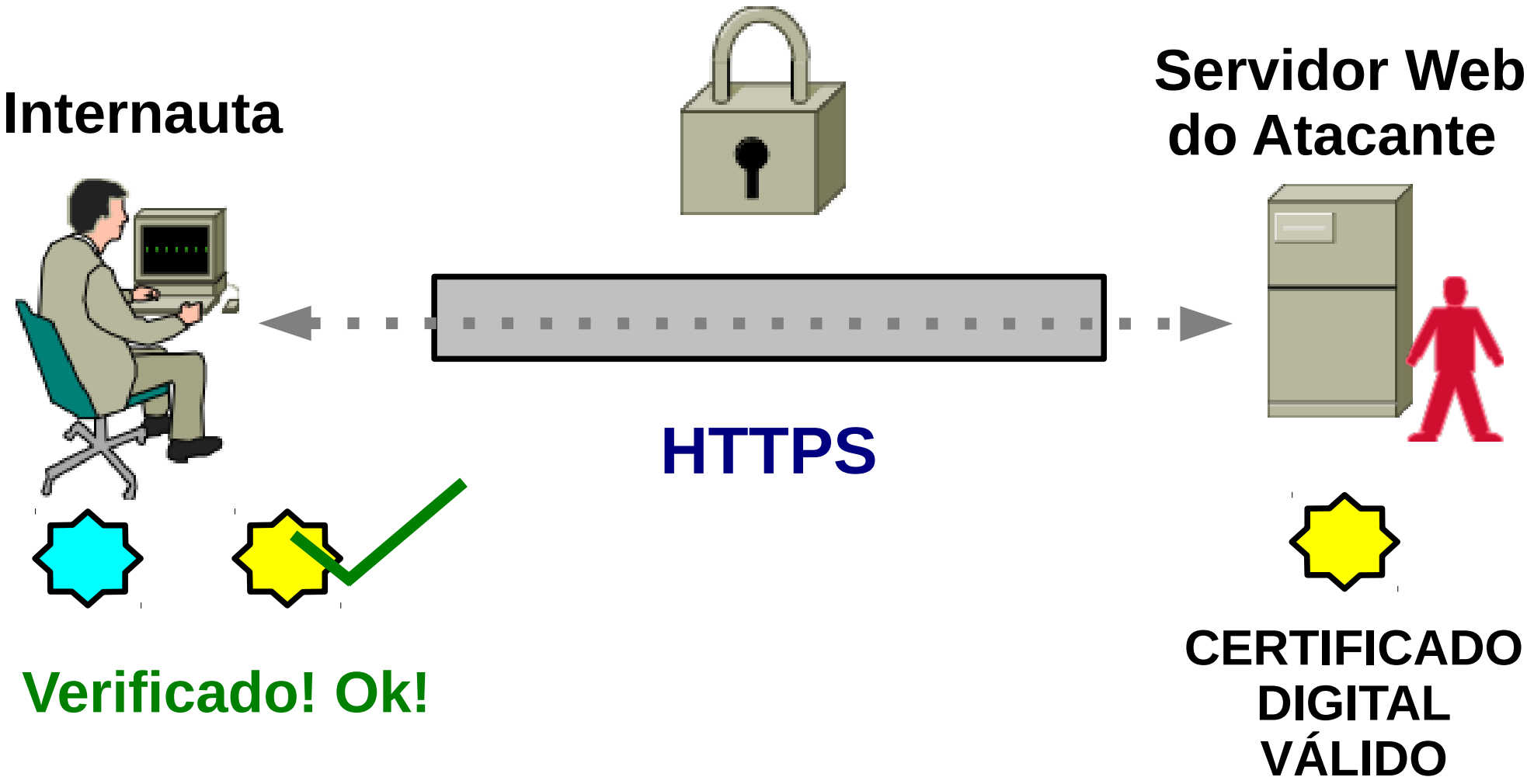

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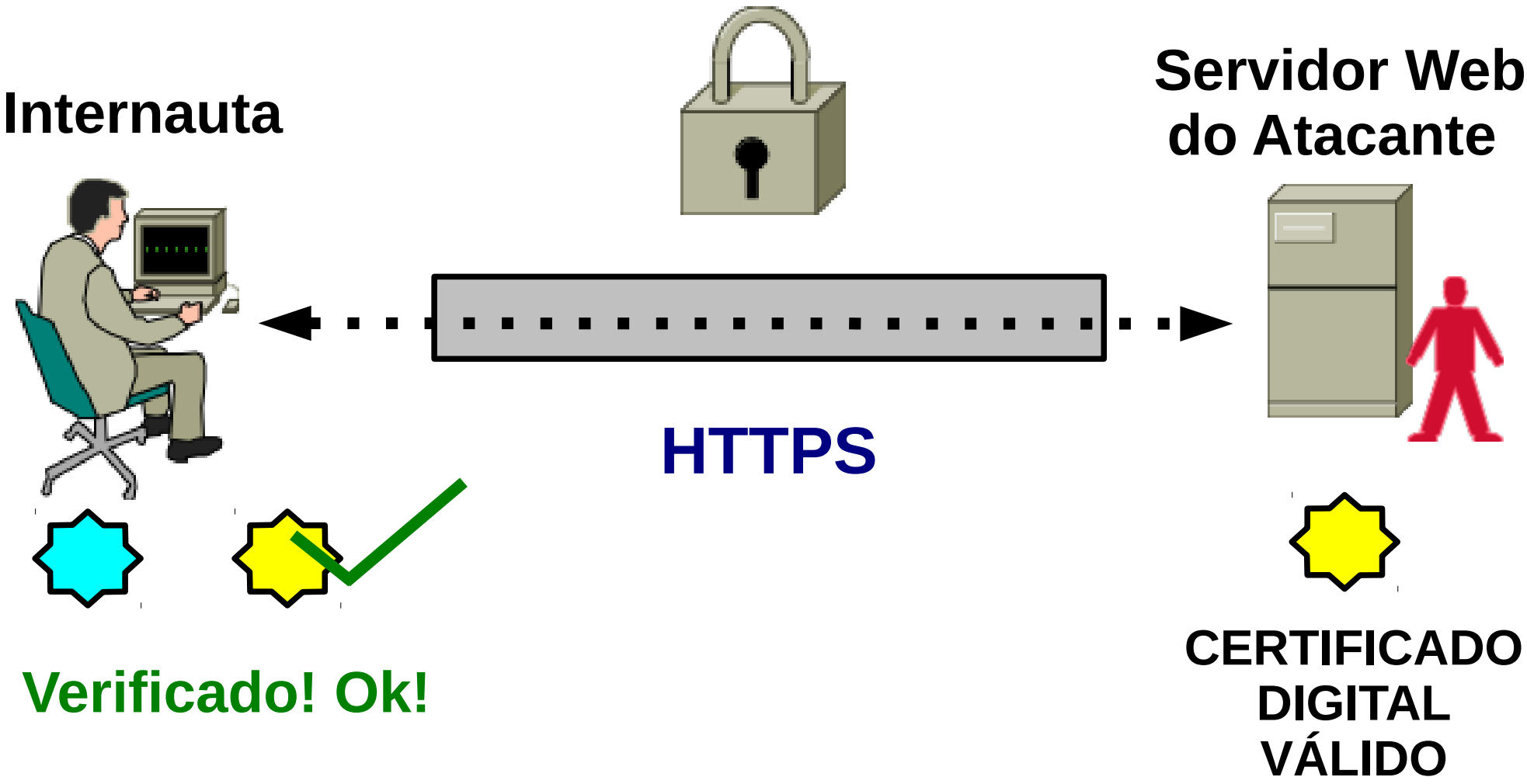

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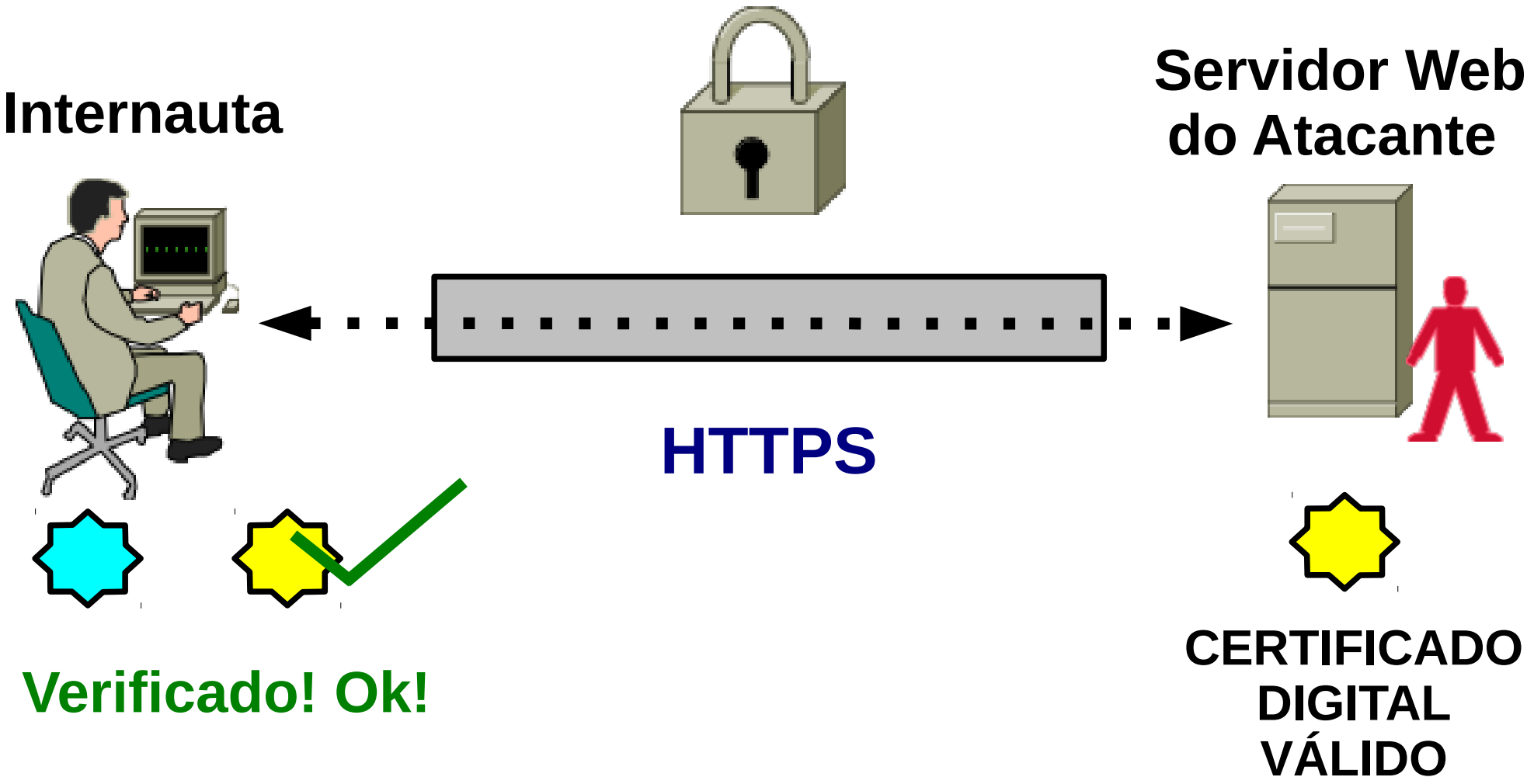

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Incidente de Segurança

- DigiNotar
- Holanda

Poderia ser utilizado para validar certificações falsas.

Setembro/2011

3 – Confiar Autoridades Certificadoras?

Solução

- Certificados Atualizados
- Conferir Acesso Seguro

UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ

Considerações Finais

Considerações Finais

Confiança:

- Serviços de Domínios (DNS)
- Rotas de Provedores (BGP)
- Autoridades Certificadoras (SSL)

Causa:

- Legado – Internet (década 80/90)
- Além das fronteiras

Considerações Finais

Edward Snowden x NSA

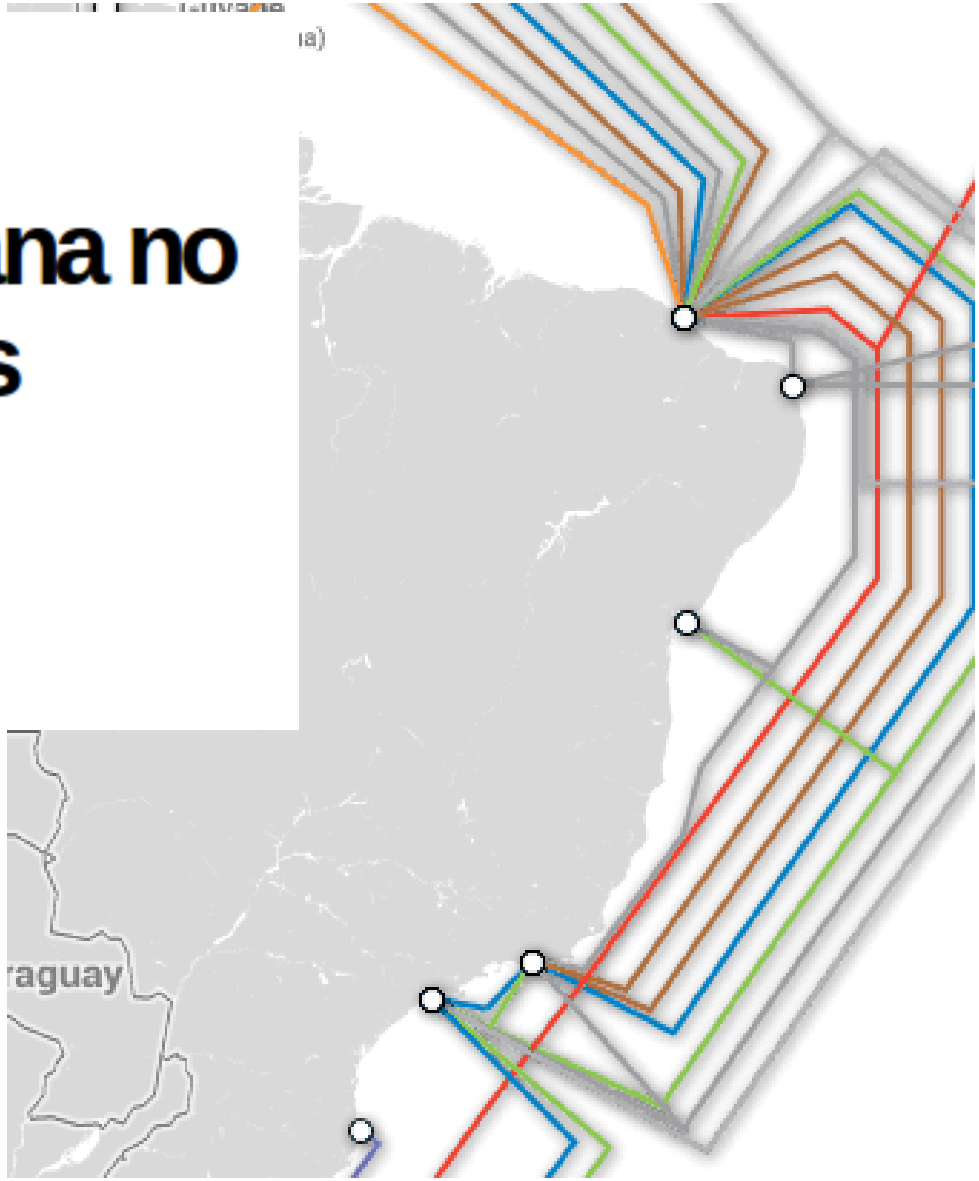
“Assuma que seu adversário é capaz de fazer um trilhão de tentativas por segundo”

Considerações Finais

Grande interesse da espionagem americana no Brasil está nos cabos submarinos 14

Luiz Felipe de Alencastro

29/07/2013 | 11h29



Gleen Greenwald (The Guardian) 08/2013

… os EUA praticam espionagem não apenas para se proteger do terrorismo, mas também para obter vantagens comerciais e industriais

Grato! :)

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Hermano Pereira

→ pereira@hermano.com.br

Slides e Referências em:

www.hermano.com.br

Obs: as animações que foram apresentadas são meramente ilustrativas.

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