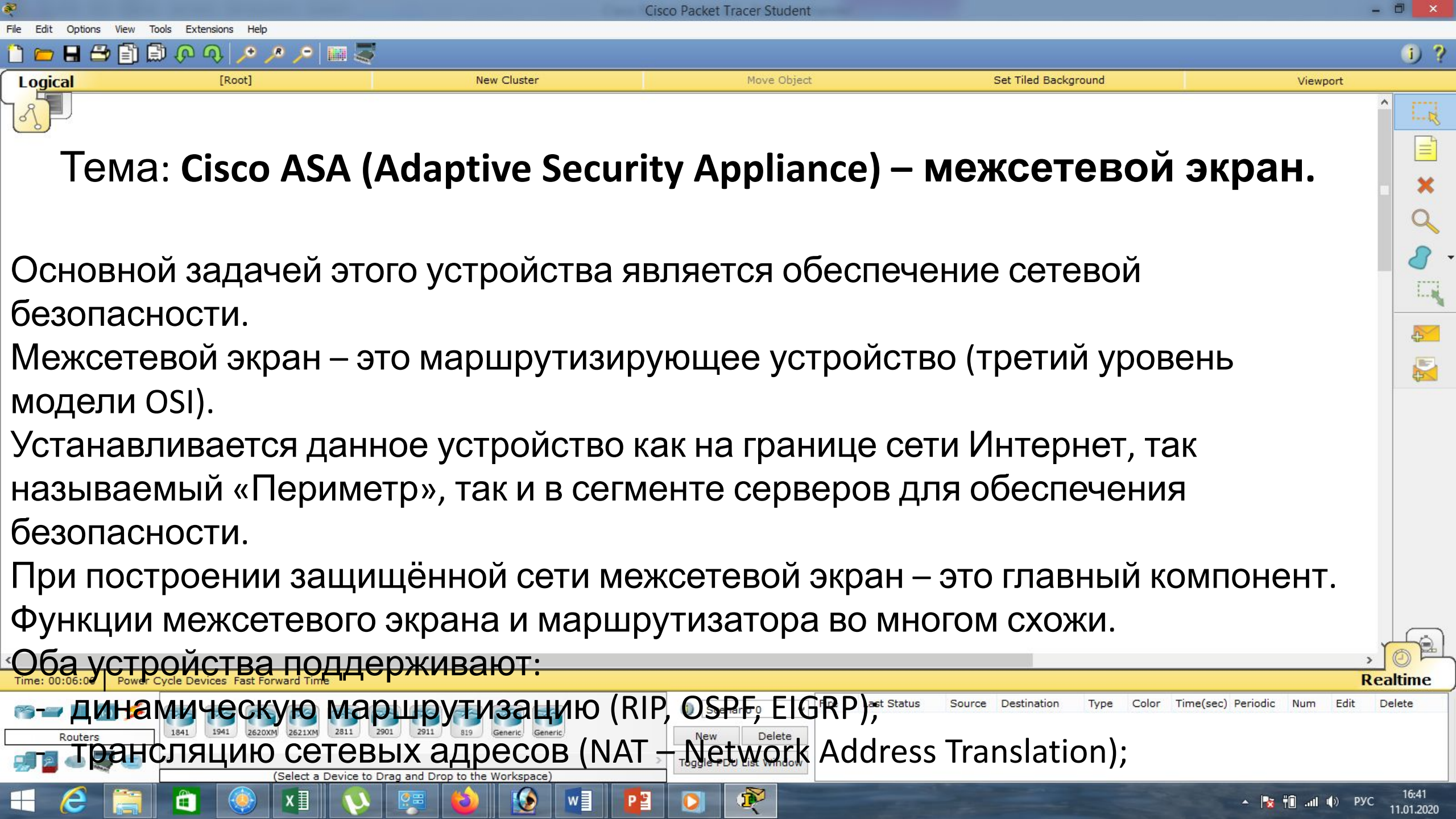
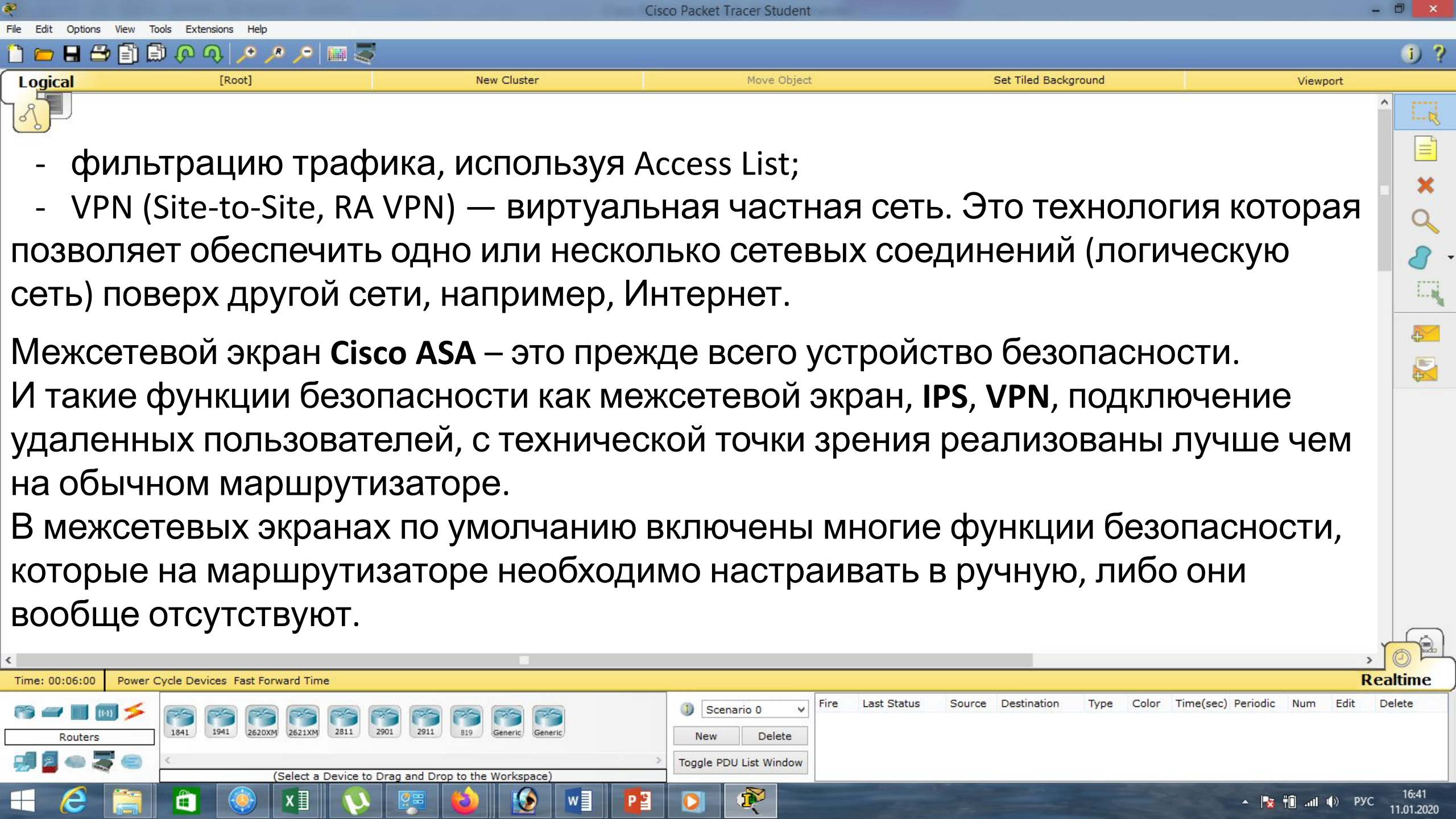
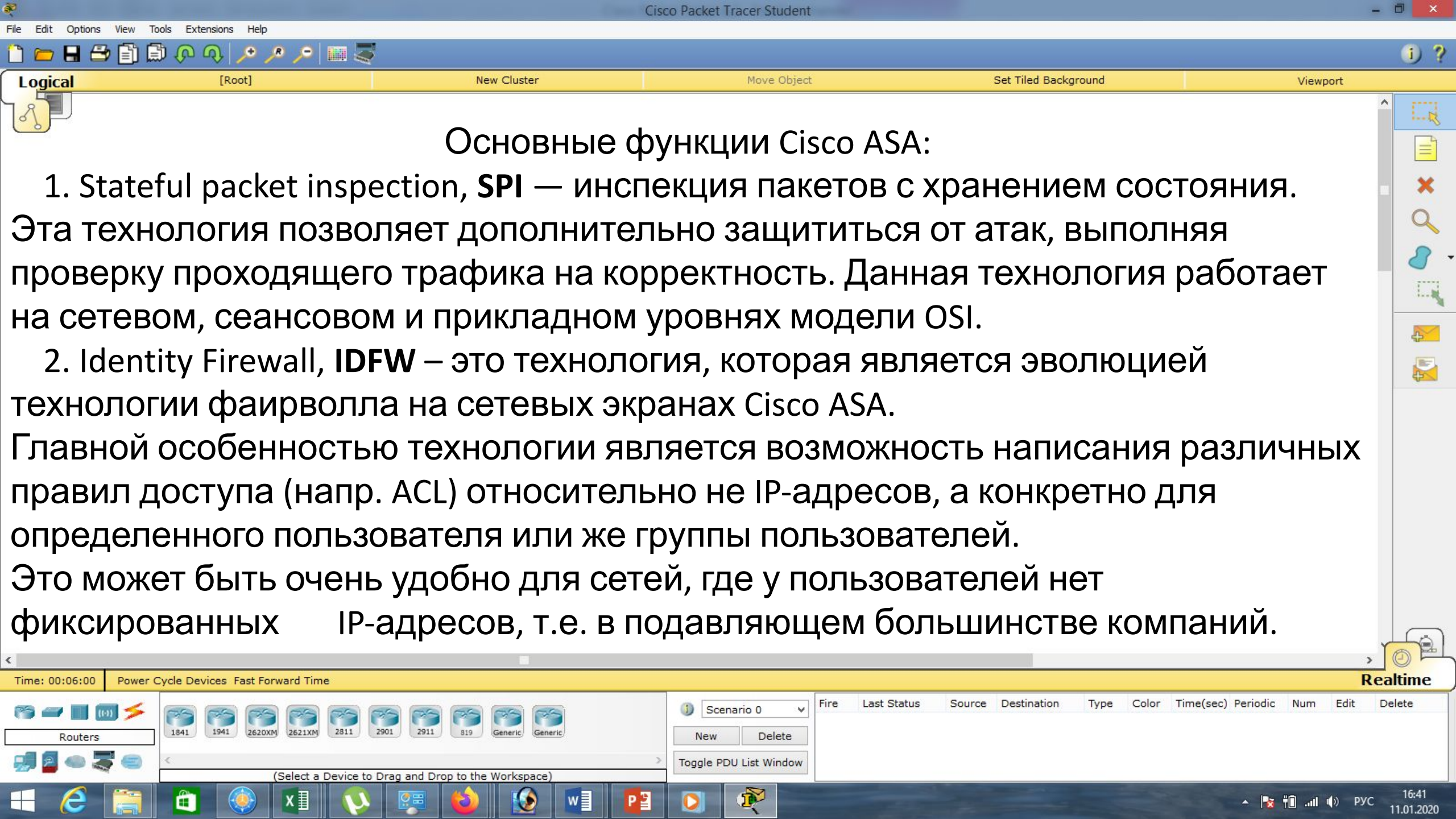
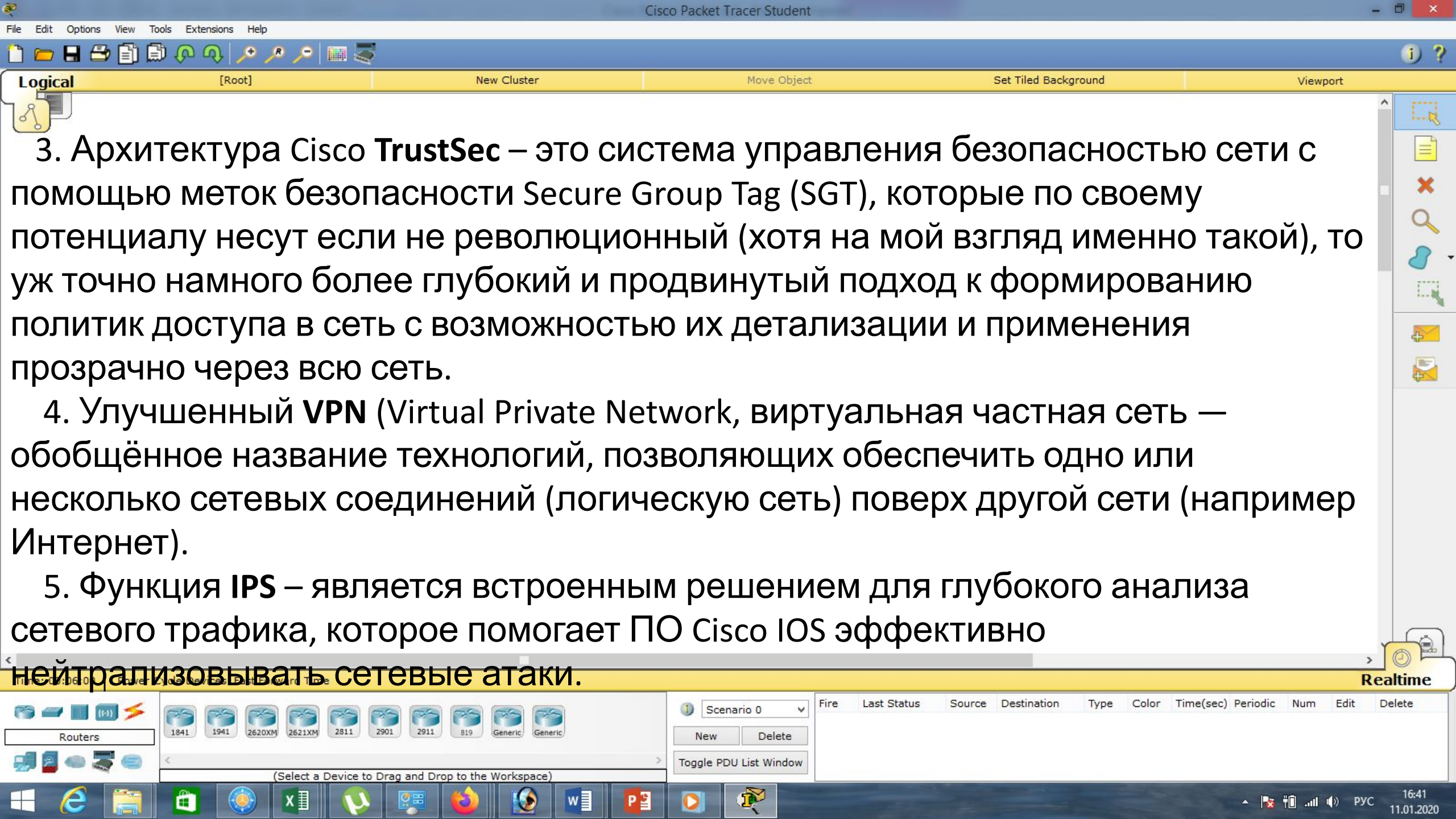
Практическое занятие

Занятие 14


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
Тема: Cisco ASA (Adaptive Security Appliance) – межсетевой экран.
Основной задачей этого устройства является обеспечение сетевой безопасности.
Межсетевой экран – это маршрутизирующее устройство (третий уровень модели OSI).
Устанавливается данное устройство как на границе сети Интернет, так называемый «Периметр», так и в сегменте серверов для обеспечения безопасности.
При построении защищённой сети межсетевой экран – это главный компонент.
Функции межсетевого экрана и маршрутизатора во многом схожи.
Оба устройства поддерживают:
- динамическую маршрутизацию (RIP, OSPF, EIGRP);
- трансляцию сетевых адресов (NAT – Network Address Translation);
Time: 00:06:06 Power Cycle Devices Fast Forward Time
Realtime
Routers
(Select a Device to Drag and Drop to the Workspace)
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
РУС 16:41 11.01.2020


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
- фильтрацию трафика, используя Access List;
- VPN (Site-to-Site, RA VPN) — виртуальная частная сеть. Это технология которая позволяет обеспечить одно или несколько сетевых соединений (логическую сеть) поверх другой сети, например, Интернет.
Межсетевой экран **Cisco ASA** – это прежде всего устройство безопасности.
И такие функции безопасности как межсетевой экран, **IPS**, **VPN**, подключение удаленных пользователей, с технической точки зрения реализованы лучше чем на обычном маршрутизаторе.
В межсетевых экранах по умолчанию включены многие функции безопасности, которые на маршрутизаторе необходимо настраивать в ручную, либо они вообще отсутствуют.
Time: 00:06:00 Power Cycle Devices Fast Forward Time
Realtime
Routers
1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
РУС 16:41 11.01.2020


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
Основные функции Cisco ASA:
1. Stateful packet inspection, **SPI** — инспекция пакетов с хранением состояния.
Эта технология позволяет дополнительно защититься от атак, выполняя проверку проходящего трафика на корректность. Данная технология работает на сетевом, сеансовом и прикладном уровнях модели OSI.
2. Identity Firewall, **IDFW** – это технология, которая является эволюцией технологии фаирволла на сетевых экранах Cisco ASA.
Главной особенностью технологии является возможность написания различных правил доступа (напр. ACL) относительно не IP-адресов, а конкретно для определенного пользователя или же группы пользователей.
Это может быть очень удобно для сетей, где у пользователей нет фиксированных IP-адресов, т.е. в подавляющем большинстве компаний.
Time: 00:06:00 Power Cycle Devices Fast Forward Time
Realtime
Routers
1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
РУС 16:41 11.01.2020


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
3. Архитектура Cisco **TrustSec** – это система управления безопасностью сети с помощью меток безопасности Secure Group Tag (SGT), которые по своему потенциалу несут если не революционный (хотя на мой взгляд именно такой), то уж точно намного более глубокий и продвинутый подход к формированию политик доступа в сеть с возможностью их детализации и применения прозрачно через всю сеть.
4. Улучшенный **VPN** (Virtual Private Network, виртуальная частная сеть — обобщённое название технологий, позволяющих обеспечить одно или несколько сетевых соединений (логическую сеть) поверх другой сети (например Интернет).
5. Функция **IPS** – является встроенным решением для глубокого анализа сетевого трафика, которое помогает ПО Cisco IOS эффективно нейтрализовывать сетевые атаки.
Realtime
Routers
1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
РУС 16:41 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Межсетевой экран это в первую очередь фильтр. Использование межсетевого экрана исключительно для маршрутизации будет неправильным, тем более что многие функции доступны только в традиционных маршрутизаторах:

- **BGP** (Border Gateway Protocol, протокол граничного шлюза) — динамический протокол маршрутизации;
- **MPLS** (Multiprotocol Label Switching, многопротокольная коммутация по меткам) — механизм в высокопроизводительной телекоммуникационной сети, осуществляющий передачу данных от одного узла сети к другому с помощью меток;
- **DMVPN** (Dynamic Multipoint Virtual Private Network — динамическая многоточечная виртуальная частная сеть) — технология для создания виртуальных частных сетей, разработанная Cisco Systems.

Time: 00:06:00 Power Cycle Devices Fast Forward Time Realtime

Routers

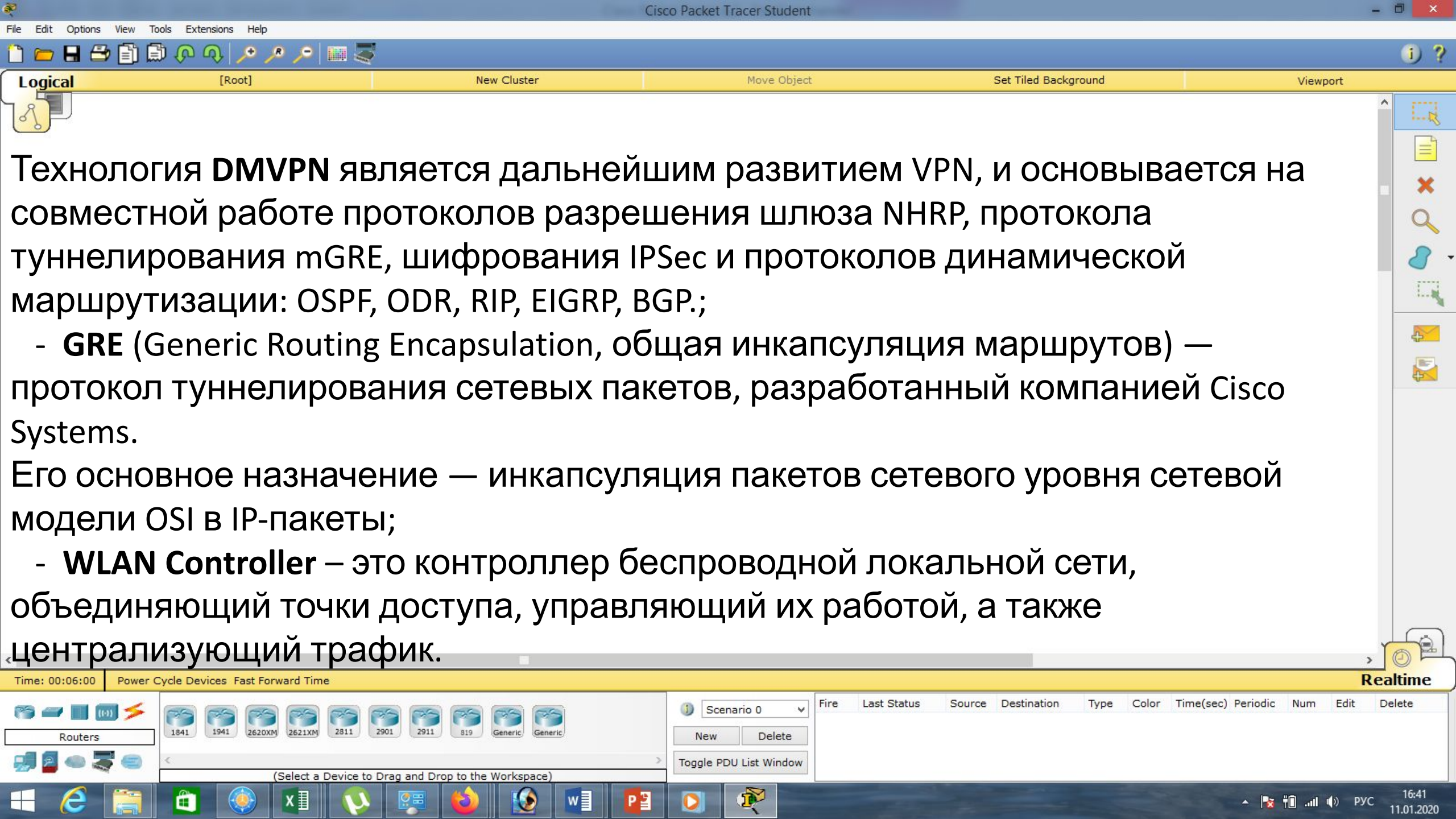
1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic

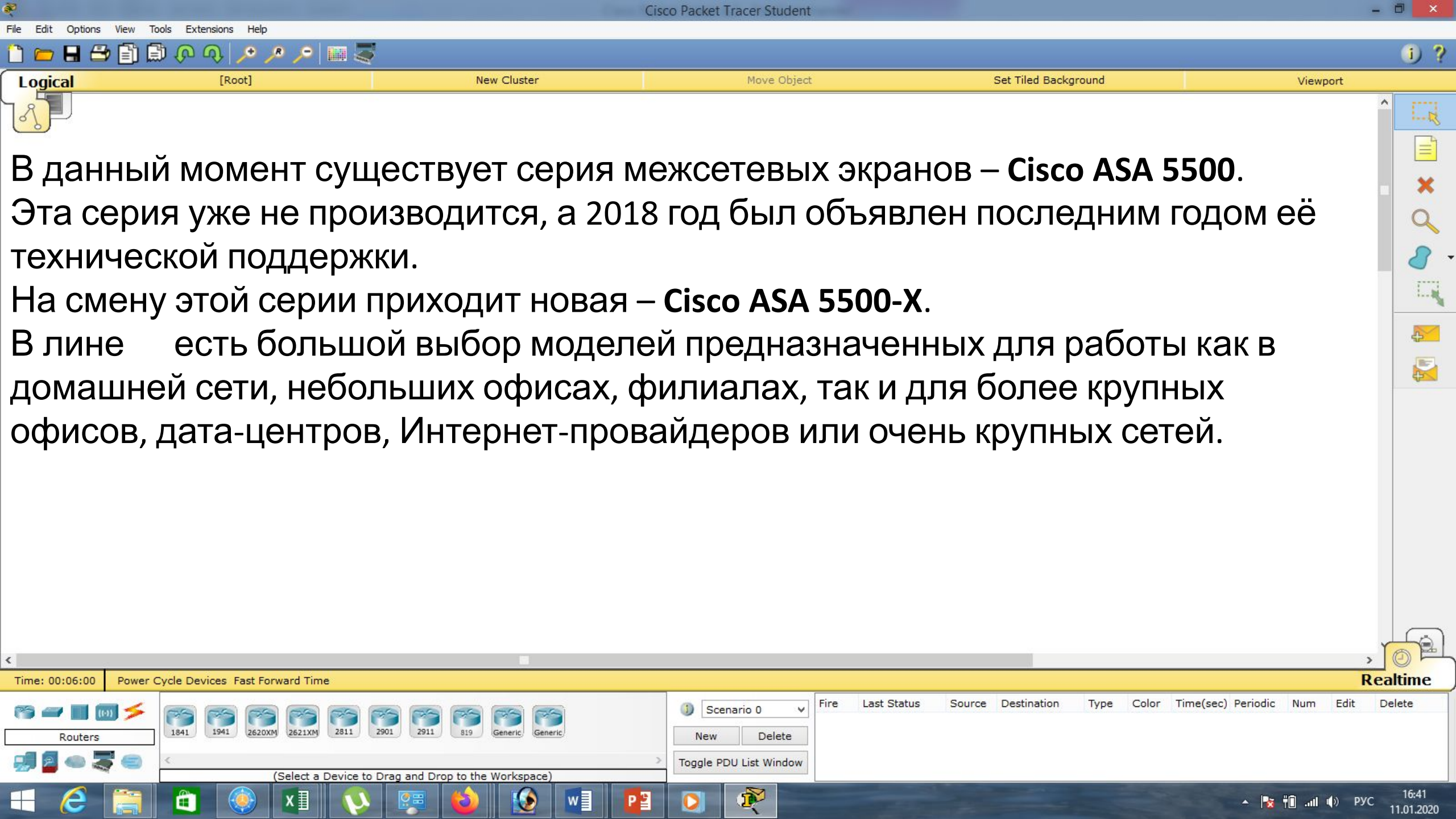
(Select a Device to Drag and Drop to the Workspace)

Scenario 0 New Delete Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

РУС 16:41 11.01.2020


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
Технология **DMVPN** является дальнейшим развитием VPN, и основывается на совместной работе протоколов разрешения шлюза NHRP, протокола туннелирования mGRE, шифрования IPSec и протоколов динамической маршрутизации: OSPF, ODR, RIP, EIGRP, BGP.;
- **GRE** (Generic Routing Encapsulation, общая инкапсуляция маршрутов) — протокол туннелирования сетевых пакетов, разработанный компанией Cisco Systems.
Его основное назначение — инкапсуляция пакетов сетевого уровня сетевой модели OSI в IP-пакеты;
- **WLAN Controller** – это контроллер беспроводной локальной сети, объединяющий точки доступа, управляющий их работой, а также централизующий трафик.
Time: 00:06:00 Power Cycle Devices Fast Forward Time Realtime
Routers
1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic
(Select a Device to Drag and Drop to the Workspace)
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
РУС 16:41 11.01.2020


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
В данный момент существует серия межсетевых экранов – Cisco ASA 5500.
Эта серия уже не производится, а 2018 год был объявлен последним годом её технической поддержки.
На смену этой серии приходит новая – Cisco ASA 5500-X.
В лине есть большой выбор моделей предназначенных для работы как в домашней сети, небольших офисах, филиалах, так и для более крупных офисов, дата-центров, Интернет-провайдеров или очень крупных сетей.
Time: 00:06:00 Power Cycle Devices Fast Forward Time
Realtime
Routers
1841 1941 2620XM 2621XM 2811 2901 2911 819 Generic Generic
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
РУС 16:41 11.01.2020

Mbps/Gbps - max throughput
cps - connections per second

Старая серия 5500

throughput - actual bandwidth that is available to a network, as opposed to theoretical bandwidth
bandwidth - how much information a network can move at a period of time

Новая серия 5500-X

Вид спереди

ASA 5512-X

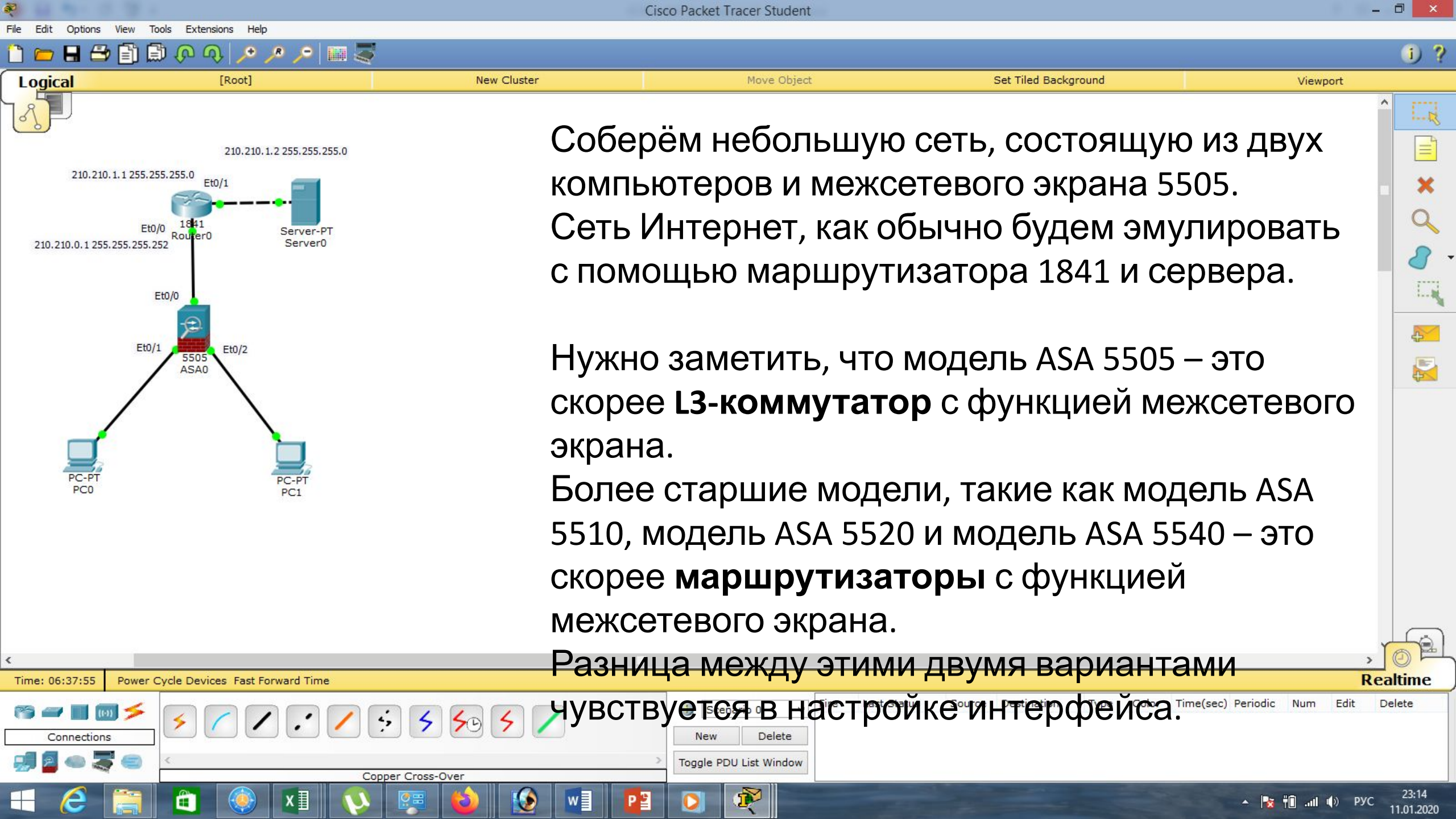
ASA 5515-X

ASA 5525-X

ASA 5545-X

ASA 5555-X

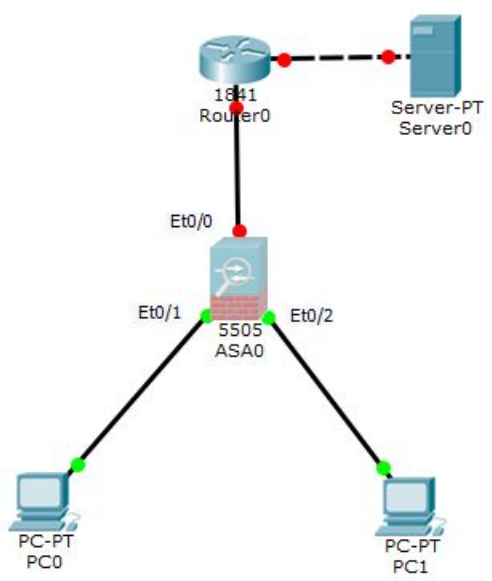
Устройство ASA 5500	Эквивалентное устройство ASA 5500-X
ASA 5510	ASA 5512-X
ASA 5510 Security Plus license	ASA 5515 или ASA 5512 Security Plus license
ASA 5520	ASA 5525-X
ASA 5540	ASA 5545-X
ASA 5550	ASA 5555-X


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
210.210.1.2 255.255.255.0
210.210.1.1 255.255.255.0
Et0/1
Et0/0
1841
Router0
210.210.0.1 255.255.255.252
Server-PT
Server0
Et0/0
Et0/1
Et0/2
5505
ASA0
PC-PT
PC0
PC-PT
PC1
Соберём небольшую сеть, состоящую из двух компьютеров и межсетевого экрана 5505.
Сеть Интернет, как обычно будем эмулировать с помощью маршрутизатора 1841 и сервера.
Нужно заметить, что модель ASA 5505 – это скорее **L3-коммутатор** с функцией межсетевого экрана.
Более старшие модели, такие как модель ASA 5510, модель ASA 5520 и модель ASA 5540 – это скорее **маршрутизаторы** с функцией межсетевого экрана.
Разница между этими двумя вариантами чувствуется в настройке интерфейса.
Time: 06:37:55
Power Cycle Devices Fast Forward Time
Realtime
Connections
Copper Cross-Over
New
Delete
Toggle PDU List Window
Time(sec)
Periodic
Num
Edit
Delete
РУС
23:14
11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Открываем в настройки межсетевого экрана, заходим в привилегированный режим.

Для этого набираем: «en».

Появляется приглашение ввести пароль.

По умолчанию пароль пустой, поэтому просто нажимаем <Enter>.

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
  sending email to export@cisco.com.
  ******************************** Warning ********************************

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(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

                Cisco Systems, Inc.
                170 West Tasman Drive
                San Jose, California 95134-1706

Reading from flash...
!



Type help or '?' for a list of available commands.

ciscoasa>en
Password:
ciscoasa#
```

Copy | Paste

Time: 02:32:40 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

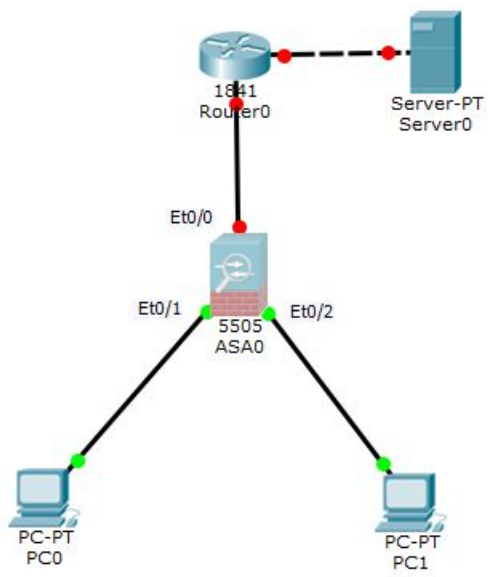
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 19:08 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Для проверки возможностей межсетевого экрана модели ASA 5505 ***набираем:***

«show version».

ASA0

Physical Config CLI

ASA Command Line Interface

```
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(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

                Cisco Systems, Inc.
                170 West Tasman Drive
                San Jose, California 95134-1706

Reading from flash...
!



Type help or '?' for a list of available commands.

ciscoasa>en
Password:
ciscoasa#
ciscoasa#show ver
ciscoasa#show version
```

Copy Paste

Time: 02:34:16 Power Cycle Devices Fast Forward Time

Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

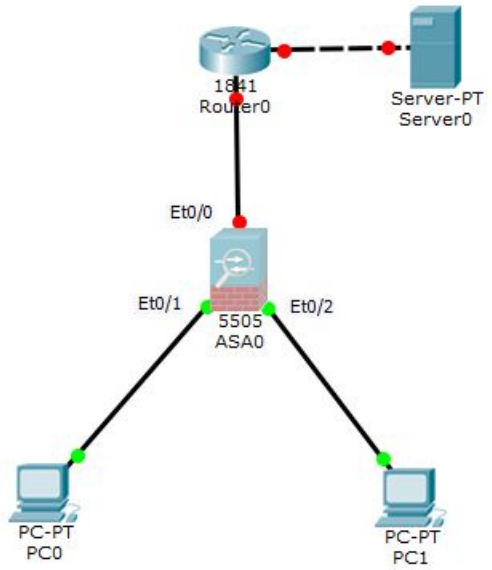
ENG 19:09 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object

Видим версию прошивки.



ASA0

Physical | Config | CLI

ASA Command Line Interface

```
Cisco Adaptive Security Appliance Software Version 8.4(2)
Device Manager Version 6.4(5)

Compiled on Wed 15-Jun-11 18:17 by mnguyen
System image file is "disk0:/asa842-k8.bin"
Config file at boot was "startup-config"

ciscoasa up 23 minutes 56 seconds

Hardware:   ASA5505, 512 MB RAM, CPU Geode 500 MHz
Internal ATA Compact Flash, 128MB
BIOS Flash M50FW016 @ 0xfff00000, 2048KB

Encryption hardware device : Cisco ASA-5505 on-board accelerator (revision 0x0)
                             Boot microcode         : CN1000-MC-BOOT-2.00
                             SSL/IKE microcode      : CNLite-MC-SSLm-PLUS-2.03
                             IPSec microcode        : CNlite-MC-IPSECm-MAIN-2.06
                             Number of accelerators: 1

 0: Int: Internal-Data0/0    : address is 44d3.caef.1e22, irq 11
 1: Ext: Ethernet0/0         : address is 00E0.F9D9.1101, irq 255
 2: Ext: Ethernet0/1         : address is 00E0.F9D9.1102, irq 255
 3: Ext: Ethernet0/2         : address is 00E0.F9D9.1103, irq 255
 4: Ext: Ethernet0/3         : address is 00E0.F9D9.1104, irq 255
 5: Ext: Ethernet0/4         : address is 00E0.F9D9.1105, irq 255
 6: Ext: Ethernet0/5         : address is 00E0.F9D9.1106, irq 255
 7: Ext: Ethernet0/6         : address is 00E0.F9D9.1107, irq 255
 8: Ext: Ethernet0/7         : address is 00E0.F9D9.1108, irq 255
 9: Int: Internal-Data0/1    : address is 0000.0003.0002, irq 255
```

Copy | Paste

Time: 02:38:49 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

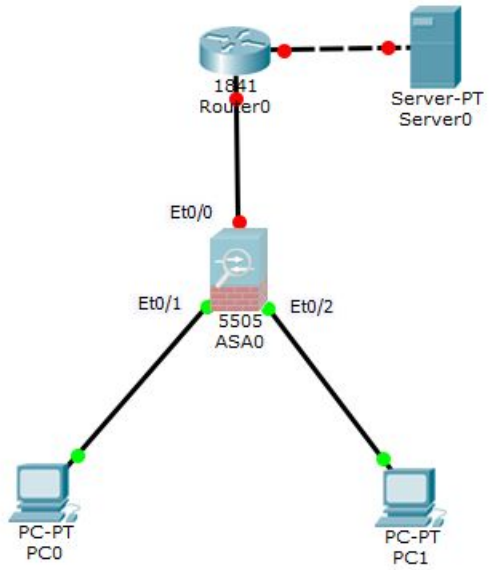
РУС 19:14 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object

Чуть ниже видим файл прошивки.



ASA0

Physical | Config | CLI

ASA Command Line Interface

```
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Device Manager Version 6.4(5)

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                             SSL/IKE microcode      : CNLite-MC-SSLm-PLUS-2.03
                             IPSec microcode        : CNlite-MC-IPSECm-MAIN-2.06
                             Number of accelerators: 1

 0: Int: Internal-Data0/0    : address is 44d3.caef.1e22, irq 11
 1: Ext: Ethernet0/0         : address is 00E0.F9D9.1101, irq 255
 2: Ext: Ethernet0/1         : address is 00E0.F9D9.1102, irq 255
 3: Ext: Ethernet0/2         : address is 00E0.F9D9.1103, irq 255
 4: Ext: Ethernet0/3         : address is 00E0.F9D9.1104, irq 255
 5: Ext: Ethernet0/4         : address is 00E0.F9D9.1105, irq 255
 6: Ext: Ethernet0/5         : address is 00E0.F9D9.1106, irq 255
 7: Ext: Ethernet0/6         : address is 00E0.F9D9.1107, irq 255
 8: Ext: Ethernet0/7         : address is 00E0.F9D9.1108, irq 255
 9: Int: Internal-Data0/1    : address is 0000.0003.0002, irq 255
```

Copy | Paste

Time: 02:41:29 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

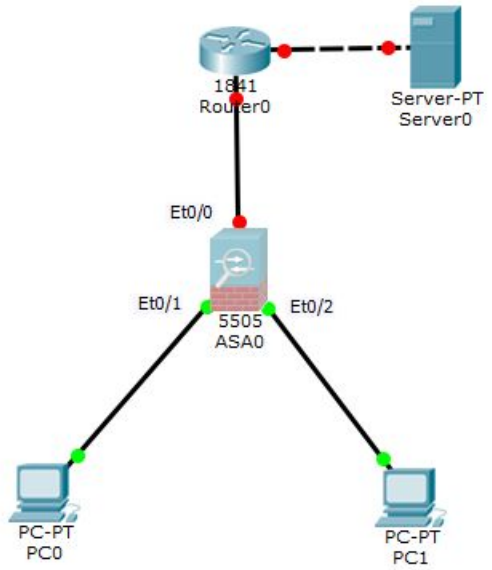
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 19:16 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Далее находим основные параметры прошивки ниже – порты.

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
Cisco Adaptive Security Appliance Software Version 8.4(2)
Device Manager Version 6.4(5)

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                             Number of accelerators: 1

 0: Int: Internal-Data0/0    : address is 44d3.caef.1e22, irq 11
 1: Ext: Ethernet0/0         : address is 00E0.F9D9.1101, irq 255
 2: Ext: Ethernet0/1         : address is 00E0.F9D9.1102, irq 255
 3: Ext: Ethernet0/2         : address is 00E0.F9D9.1103, irq 255
 4: Ext: Ethernet0/3         : address is 00E0.F9D9.1104, irq 255
 5: Ext: Ethernet0/4         : address is 00E0.F9D9.1105, irq 255
 6: Ext: Ethernet0/5         : address is 00E0.F9D9.1106, irq 255
 7: Ext: Ethernet0/6         : address is 00E0.F9D9.1107, irq 255
 8: Ext: Ethernet0/7         : address is 00E0.F9D9.1108, irq 255
 9: Int: Internal-Data0/1    : address is 0000.0003.0002, irq 255
```

Copy | Paste

Time: 02:42:48 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

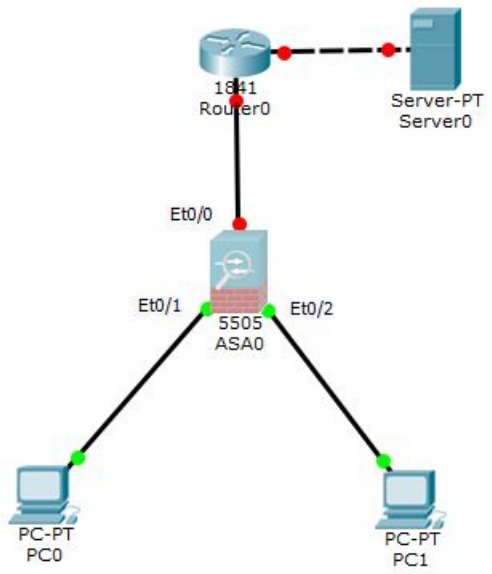
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 19:18 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Перемещаемся в самый низ.
Видим, что установлена базовая лицензия.
На данный момент сменить её невозможно.

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
Licensed features for this platform:
Maximum Physical Interfaces       : 8              perpetual
VLANs                             : 3              DMZ Restricted
Dual ISPs                         : Disabled       perpetual
VLAN Trunk Ports                  : 0              perpetual
Inside Hosts                      : 10             perpetual
Failover                          : Disabled       perpetual
VPN-DES                           : Enabled        perpetual
VPN-3DES-AES                      : Enabled        perpetual
AnyConnect Premium Peers          : 2              perpetual
AnyConnect Essentials             : Disabled       perpetual
Other VPN Peers                   : 10             perpetual
Total VPN Peers                   : 25             perpetual
Shared License                    : Disabled       perpetual
AnyConnect for Mobile             : Disabled       perpetual
AnyConnect for Cisco VPN Phone    : Disabled       perpetual
Advanced Endpoint Assessment      : Disabled       perpetual
UC Phone Proxy Sessions           : 2              perpetual
Total UC Proxy Sessions           : 2              perpetual
Botnet Traffic Filter             : Disabled       perpetual
Intercompany Media Engine         : Disabled       perpetual

This platform has a Base license.

Serial Number: JMX1536T2F9
Running Permanent Activation Key: 0x8L39GM6H 0xPGAE572H 0xI74W8T07 0xVMQRVKB5
0x72F1UL61
Configuration register is 0x1
Configuration has not been modified since last system restart.

ciscoasa#
```

Copy | Paste

Time: 02:46:17 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

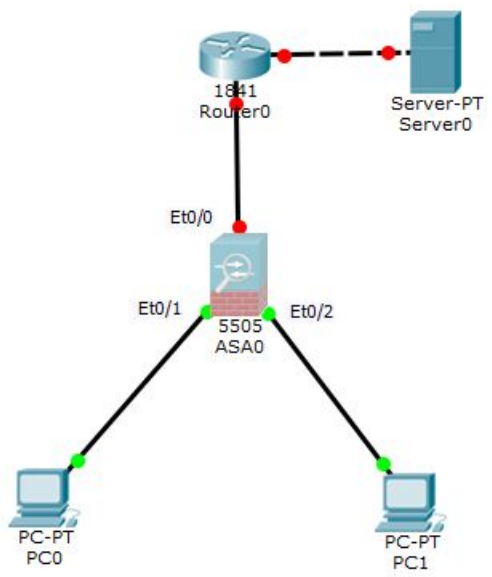
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 19:21 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Максимальное количество VLANs ***равно трём.***
Причём один из них (DNZ***), как правило ограниченный.***

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
Licensed features for this platform:
Maximum Physical Interfaces       : 8              perpetual
VLANs                             : 3              DMZ Restricted
Dual ISPs                         : Disabled       perpetual
VLAN Trunk Ports                  : 0              perpetual
Inside Hosts                      : 10             perpetual
Failover                          : Disabled       perpetual
VPN-DES                           : Enabled        perpetual
VPN-3DES-AES                      : Enabled        perpetual
AnyConnect Premium Peers          : 2              perpetual
AnyConnect Essentials             : Disabled       perpetual
Other VPN Peers                   : 10             perpetual
Total VPN Peers                   : 25             perpetual
Shared License                    : Disabled       perpetual
AnyConnect for Mobile             : Disabled       perpetual
AnyConnect for Cisco VPN Phone    : Disabled       perpetual
Advanced Endpoint Assessment      : Disabled       perpetual
UC Phone Proxy Sessions           : 2              perpetual
Total UC Proxy Sessions           : 2              perpetual
Botnet Traffic Filter             : Disabled       perpetual
Intercompany Media Engine         : Disabled       perpetual

This platform has a Base license.

Serial Number: JMX1536T2F9
Running Permanent Activation Key: 0x8L39GM6H 0xPGAE572H 0xI74W8T07 0xVMQRVKB5
0x72F1UL61
Configuration register is 0x1
Configuration has not been modified since last system restart.

ciscoasa#
```

Copy | Paste

Time: 02:48:53 | Power Cycle Devices | Fast Forward Time

Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

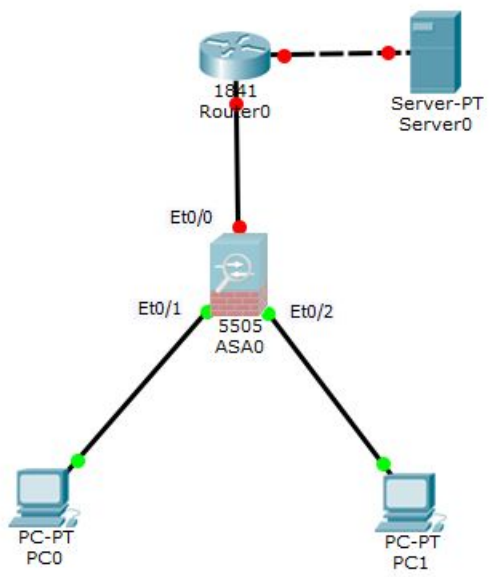
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 19:24 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Также видим, что у нас нет возможности использовать Trunk Ports***.***
Это делает макетирование в Cisco Packet Tracer ***весьма неудобным.***
Будем ждать новые версии, а пока придётся работать с тем, что есть.

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
Licensed features for this platform:
Maximum Physical Interfaces       : 8              perpetual
VLANs                             : 3              DMZ Restricted
Dual ISPs                         : Disabled       perpetual
VLAN Trunk Ports                  : 0              perpetual
Inside Hosts                      : 10             perpetual
Failover                          : Disabled       perpetual
VPN-DES                           : Enabled        perpetual
VPN-3DES-AES                      : Enabled        perpetual
AnyConnect Premium Peers          : 2              perpetual
AnyConnect Essentials             : Disabled       perpetual
Other VPN Peers                   : 10             perpetual
Total VPN Peers                   : 25             perpetual
Shared License                    : Disabled       perpetual
AnyConnect for Mobile             : Disabled       perpetual
AnyConnect for Cisco VPN Phone    : Disabled       perpetual
Advanced Endpoint Assessment      : Disabled       perpetual
UC Phone Proxy Sessions           : 2              perpetual
Total UC Proxy Sessions           : 2              perpetual
Botnet Traffic Filter             : Disabled       perpetual
Intercompany Media Engine         : Disabled       perpetual

This platform has a Base license.

Serial Number: JMX1536T2F9
Running Permanent Activation Key: 0x8L39GM6H 0xPGAE572H 0xI74W8T07 0xVMQRVKB5
0x72F1UL61
Configuration register is 0x1
Configuration has not been modified since last system restart.

ciscoasa#
```

Copy | Paste

Time: 02:52:02 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

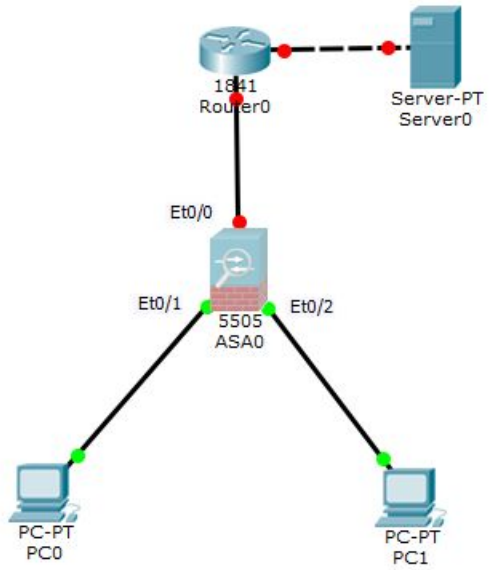
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 19:27 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Проверим преднастройки межсетевого экрана: «show run». ***Видим, что*** interface Ethernet0/0 ***определён во*** vlan 2***, по умолчанию он*** outside ***(внешний),*** security-level – 0 ***(уровень защиты равен*** 0***) и включен*** dhcp-клиент.

Остальные интерфейсы определены во vlan 1***, по умолчанию –*** inside ***(внутренние),*** security-level – 100 ***и уже назначен*** ip-address 192.168.1.1 255.255.255.0.

ASA0

Physical Config CLI

ASA Command Line Interface

```
ciscoasa#
ciscoasa#show run
: Saved
:
ASA Version 8.4(2)
!
hostname ciscoasa
names
!
interface Ethernet0/0
 switchport access vlan 2
!
interface Ethernet0/1
!
interface Ethernet0/2
!
interface Ethernet0/3
!
interface Ethernet0/4
!
interface Ethernet0/5
!
interface Ethernet0/6
!
interface Ethernet0/7
!
interface Vlan1
 nameif inside
 security-level 100
 ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
 nameif outside
 security-level 0
 ip address dhcp
!
!
!
!
!
```

Copy Paste

Time: 03:11:16 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

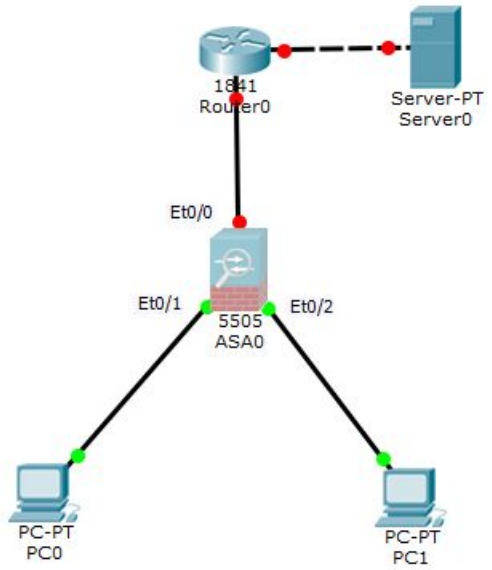
Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete

ENG 19:46 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Опускаемся ещё ниже и видим, что по умолчанию настроен dhcp-сервер ***на внутреннем интерфейсе.***
Это значит, он будет раздавать ip-адреса ***подключенным компьютерам.***

ASA0

Physical Config CLI

ASA Command Line Interface

```
!
interface Ethernet0/5
!
interface Ethernet0/6
!
interface Ethernet0/7
!
interface Vlan1
 nameif inside
 security-level 100
 ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
 nameif outside
 security-level 0
 ip address dhcp
!
!
!
!
!
!
!
!
!
!
!
telnet timeout 5
ssh timeout 5
!
dhcpd address 192.168.1.5-192.168.1.35 inside
dhcpd enable inside
!
dhcpd auto_config outside
!
!
!
!
!
ciscoasa#
```

Copy Paste

Time: 03:28:35 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

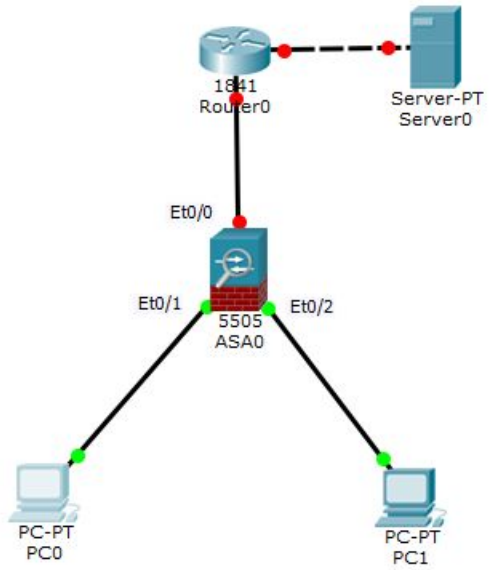
Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete

РУС 20:04 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Если это верно, получим ip-адрес ***для компьютера*** PC0***.***
Сработало, ip-адрес ***получен.***

PC0

Physical Config Desktop Custom Interface

IP Configuration X

IP Configuration

DHCP Static DHCP request successful.

IP Address	192.168.1.5
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address	/
Link Local Address	FE80::206:2AFF:FE7E:4634
IPv6 Gateway	
IPv6 DNS Server	

Time: 03:33:01 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

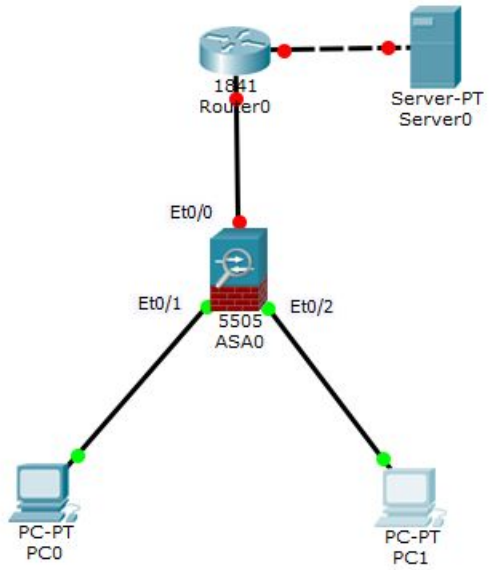
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 20:08 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Точно также получим ip-адрес ***для компьютера*** PC1**.**

Результат тот же, ip-адрес ***получен.***

PC1

Physical | Config | Desktop | Custom Interface

IP Configuration

IP Configuration

(•) DHCP ( ) Static DHCP request successful.

IP Address	192.168.1.6
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	

IPv6 Configuration

( ) DHCP ( ) Auto Config (•) Static

IPv6 Address	/
Link Local Address	FE80::20D:BDFF:FEC0:13DA
IPv6 Gateway	
IPv6 DNS Server	

Time: 03:36:37 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

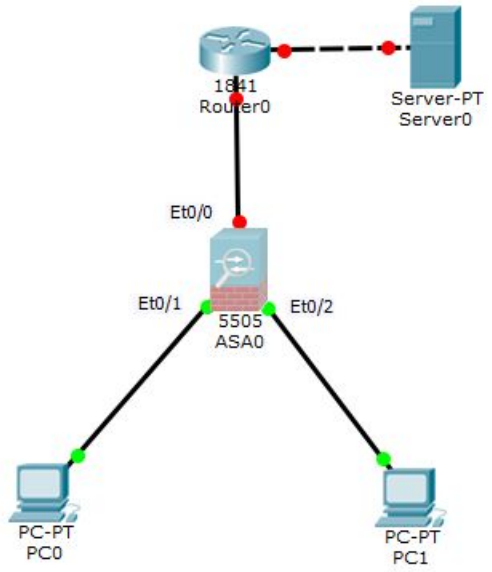
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 20:12 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Предположим, что на одном из компьютеров администратор хочет удалённо администрировать ASA. ***Для этого на*** ASA ***набираем:*** «conf t». ***Зададим пароль на привилегированный режим, например,*** cisco: «enable password cisco» ***и создадим пользователя admin с пороле́м*** cisco: «username admin password cisco»

ASA0

Physical Config CLI

ASA Command Line Interface

```
!
inet timeout 5
ssh timeout 5
!
dhcpd address 192.168.1.5-192.168.1.35 inside
dhcpd enable inside
!
dhcpd auto_config outside
!
!
!
!
!
ciscoasa#conf t
ciscoasa(config)#en
ciscoasa(config)#ena
ciscoasa(config)#enable pass
ciscoasa(config)#enable password cisco
ciscoasa(config)#user
ciscoasa(config)#username admin pass
ciscoasa(config)#username admin password cisco
ciscoasa(config)#
```

Copy Paste

Time: 03:53:16 Power Cycle Devices Fast Forward Time

Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

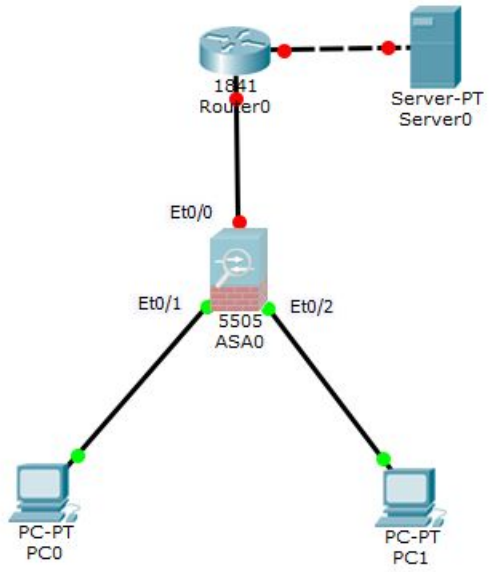
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

РУС 20:29 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Набираем:

«show run».

Видим, что пароль на вход в привилегированный режим ***и на вход*** пользователя ***(см. внизу) зашифрованы!***

Это одна из функций безопасности, включенных по умолчанию (в отличие от коммутаторов и маршрутизаторов).

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
hostname ciscoasa
enable password 4IncP7vTjpaba2aF encrypted
names
!
interface Ethernet0/0
 switchport access vlan 2
!
interface Ethernet0/1
!
interface Ethernet0/2
!
interface Ethernet0/3
!
interface Ethernet0/4
!
interface Ethernet0/5
!
interface Ethernet0/6
!
interface Ethernet0/7
!
interface Vlan1
 nameif inside
 security-level 100
 ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
 nameif outside
 security-level 0
 ip address dhcp
!
!
!
!
!
!
!
!
username admin password 4IncP7vTjpaba2aF encrypted
!
<--- More --->
```

Copy | Paste

Time: 03:57:39 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

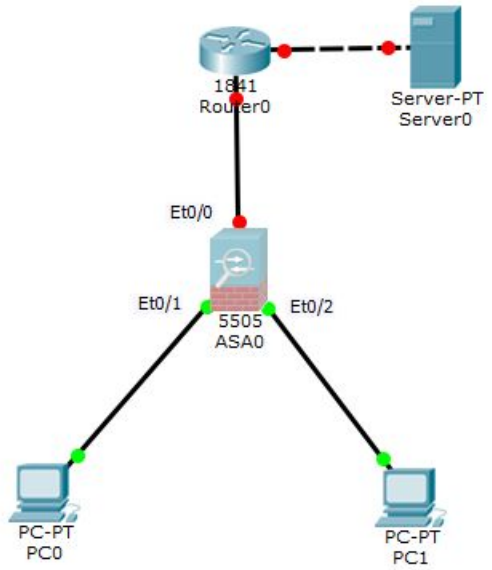
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 20:33 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Выберем протокол SSH, по которому будем осуществлять удалённый доступ, указываем ip-адрес ***сети и интерфейс.***
Так как команда длинная, для просмотра вариантов пользуемся знаком «?»***:***
«ssh 192.168.1.0 255.255.255.0 inside».

ASA0

Physical Config CLI

ASA Command Line Interface

```
!
telnet timeout 5
ssh timeout 5
!
dhcpd address 192.168.1.5-192.168.1.35 inside
dhcpd enable inside
!
dhcpd auto_config outside
!
!
!
!
!
ciscoasa(config)#ssh ?

configure mode commands/options:
  WORD                The IP address of the host and/or network authorized to
                      login to the system
  X:X:X:X::X/<0-128>  IPv6 address/prefix authorized to login to the system
  timeout             Configure ssh idle timeout
ciscoasa(config)#ssh 192.168.1.0 255.255.255.0 ins
ciscoasa(config)#ssh 192.168.1.0 255.255.255.0 inside
ciscoasa(config)#
```

Copy Paste

Time: 04:08:17 Power Cycle Devices Fast Forward Time

Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

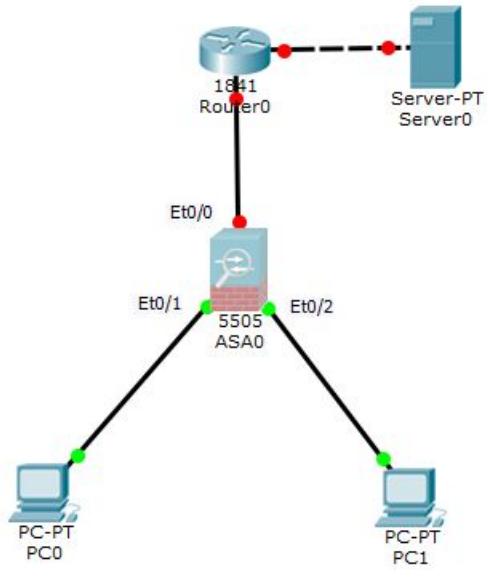
Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete

ENG 20:44 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



ASA0

Physical | Config | CLI

ASA Command Line Interface

```
  timeout              Configure ssh idle timeout
ciscoasa(config)#ssh 192.168.1.0 255.255.255.0 ins
ciscoasa(config)#ssh 192.168.1.0 255.255.255.0 inside
ciscoasa(config)#
ciscoasa(config)#aaa aut
ciscoasa(config)#aaa authentication ?

configure mode commands/options:
  ssh      SSH
  telnet   Telnet
ciscoasa(config)#aaa authentication ssh ?

configure mode commands/options:
  console  Specify this keyword to identify a server group for administrative
           authentication
ciscoasa(config)#aaa authentication ssh co
ciscoasa(config)#aaa authentication ssh console ?

configure mode commands/options:
  LOCAL  Predefined server tag for AAA protocol 'local'
ciscoasa(config)#aaa authentication ssh console L
ciscoasa(config)#aaa authentication ssh console LOCAL
ciscoasa(config)#
```

Copy Paste

Далее задаём параметры аутентификации пользователя. Так как команда длинная, для просмотра вариантов пользуемся знаком «?»***:***

«aaa authentication ssh console LOCAL».

Time: 04:16:47 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

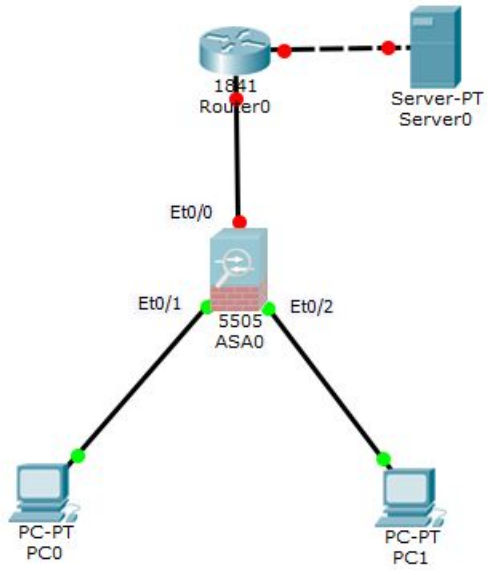
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 20:52 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Наберём команду:

«show run».

На этом устройстве она доступна в любой момент (не так как на коммутаторах и маршрутизаторах).

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
ciscoasa(config)#
ciscoasa(config)#
ciscoasa(config)#show run
: Saved
:
ASA Version 8.4(2)
!
hostname ciscoasa
enable password 4IncP7vTjpaba2aF encrypted
names
!
interface Ethernet0/0
 switchport access vlan 2
!
interface Ethernet0/1
!
interface Ethernet0/2
!
interface Ethernet0/3
!
interface Ethernet0/4
!
interface Ethernet0/5
!
interface Ethernet0/6
!
interface Ethernet0/7
!
interface Vlan1
 nameif inside
 security-level 100
 ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
 nameif outside
 security-level 0
 ip address dhcp
!
```

Copy | Paste

Time: 04:20:51 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

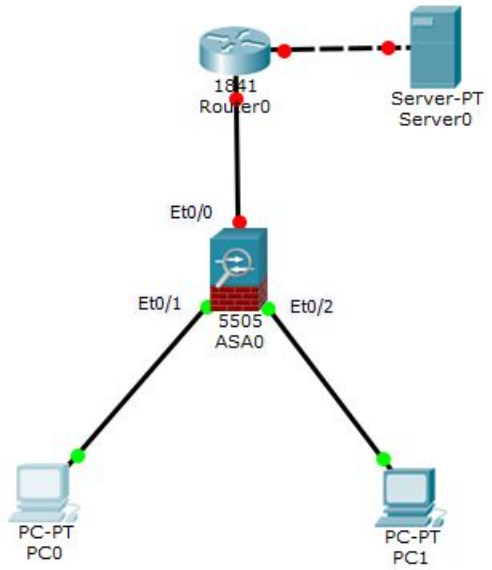
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 20:56 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Попробуем удалённо подключиться к межсетевому экрану с компьютера PC0***:***
«ssh -l admin 192.168.1.1»***,***
пароль: cisco***.***
Входим в привилегированный режим: «en»***, пароль:*** cisco***,***
далее: «show run»***.***
Видим, что удалённый доступ настроен!!!

PC0

Physical | Config | Desktop | Custom Interface

Command Prompt X

```
Packet Tracer PC Command Line 1.0
PC>ssh -l admin 192.168.1.1
Open
Password:



ciscoasa>en
Password:
ciscoasa#
ciscoasa#show run
: Saved
:
ASA Version 8.4(2)
!
hostname ciscoasa
enable password 4IncP7vTjpaba2aF encrypted
names
!
interface Ethernet0/0
 switchport access vlan 2
!
interface Ethernet0/1
!
interface Ethernet0/2
!
interface Ethernet0/3
!
interface Ethernet0/4
!
interface Ethernet0/5
!
interface Ethernet0/6
<--- More --->
```

Time: 04:32:36 | Power Cycle Devices | Fast Forward Time

Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

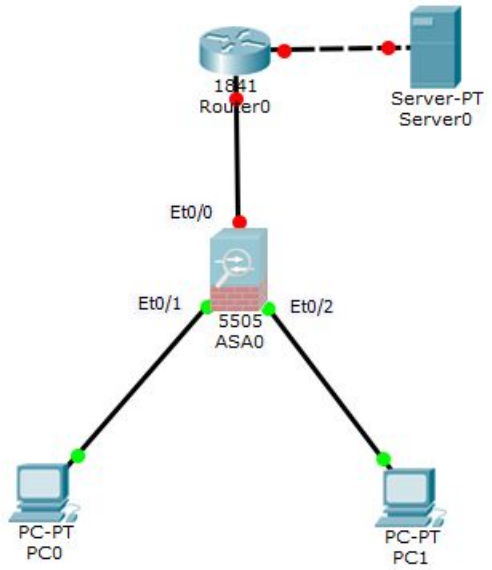
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 21:08 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Настроим уровень доверия к интерфейсу Security Level***. Чем выше его значение, тем выше уровень доверия. Самый*** высокий уровень доверия – ***у внутреннего интерфейса. Самый*** низкий – ***у внешнего интерфейса.***

ASA0

Physical Config CLI

ASA Command Line Interface

```
interface Ethernet0/6
!
interface Ethernet0/7
!
interface Vlan1
 nameif inside
 security-level 100
 ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
 nameif outside
 security-level 0
 ip address dhcp
!
!
!
!
!
!
aaa authentication ssh console LOCAL
!
!
username admin password 4IncP7vTjpaba2aF encrypted
```

Copy Paste

По умолчанию разрешен трафик с более высокого уровня доверия на более низкий.

У нас внутренняя сеть имеет security-level 100***, а внешняя –*** security-level 0***. То есть из внешней сети по умолчанию трафик закрыт.***

Time: 04:51:42 Power Cycle Devices Fast Forward Time

Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

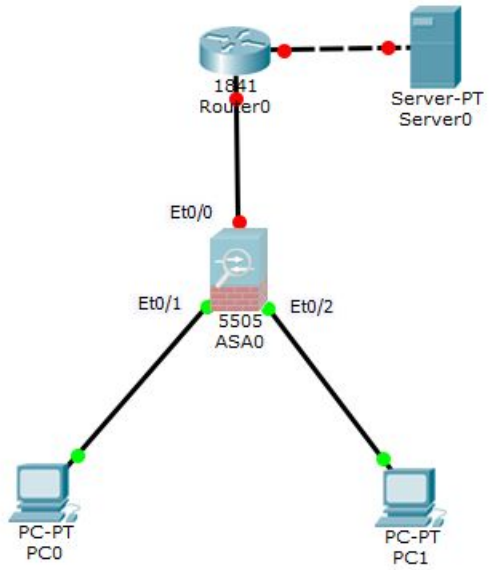
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 21:27 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Уровень доверия к интерфейсу Security Level ***можно легко изменить, например, на*** 95.

Для этого в режиме глобального конфигурирования набираем:

«int vlan 1»,

«security-level 95»,

«end»,

«show run».

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
!
!
!
telnet timeout 5
ssh 192.168.1.0 255.255.255.0 inside
ssh timeout 5
!
dhcpd address 192.168.1.5-192.168.1.35 inside
dhcpd enable inside
!
dhcpd auto_config outside
!
!
!
!
!
ciscoasa(config)#int vlan 1
ciscoasa(config-if)#sec
ciscoasa(config-if)#security-level 95
ciscoasa(config-if)#end
ciscoasa#
ciscoasa#
ciscoasa#show run
```

Copy Paste

Time: 05:03:01 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

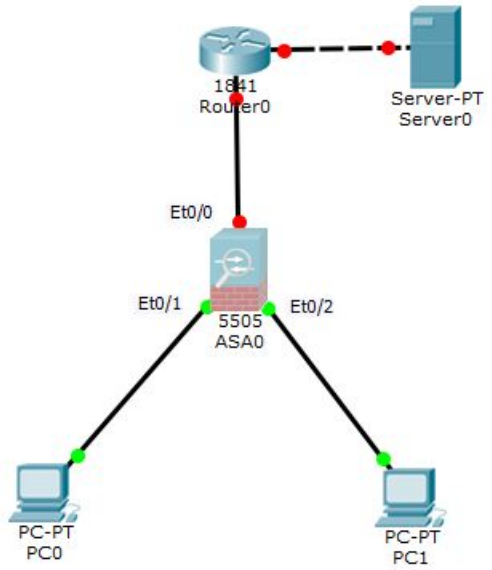
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 21:39 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Видим, что Security Level ***изменился со*** 100 ***на*** 95**.**

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
!
interface Ethernet0/7
!
interface Vlan1
 nameif inside
 security-level 95
 ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
 nameif outside
 security-level 0
 ip address dhcp
!
!
!
!
!
!
aaa authentication ssh console LOCAL
!
!
username admin password 4IncP7vTjpaba2aF encrypted
<--- More --->
```

Copy | Paste

Time: 05:07:44 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

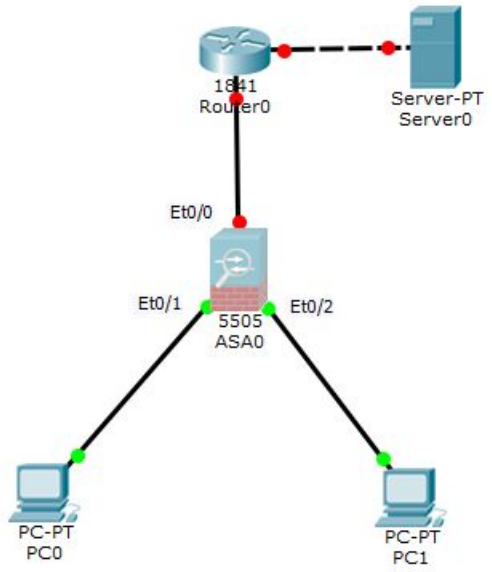
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 21:43 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Настроим внешний интерфейс:

«conf t»,

«int vlan 2».

Введём ip-адрес***, который предположительно, нам выдал провайдер:***

«ip address 210.210.0.2 255.255.255.252»,

«no shutdown»,

«exit»,

«show run».

ASA0

Physical Config CLI

ASA Command Line Interface

```
!
telnet timeout 5
ssh 192.168.1.0 255.255.255.0 inside
ssh timeout 5
!
dhcpd address 192.168.1.5-192.168.1.35 inside
dhcpd enable inside
!
dhcpd auto_config outside
!
!
!
!
!
ciscoasa#conf t
ciscoasa(config)#int vlan 2
ciscoasa(config-if)#ip add
ciscoasa(config-if)#ip address 210.210.0.2 255.255.255.252
ciscoasa(config-if)#no sh
ciscoasa(config-if)#no shutdown

ciscoasa(config-if)#exit
ciscoasa(config)#show run
```

Copy Paste

Time: 05:17:46 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

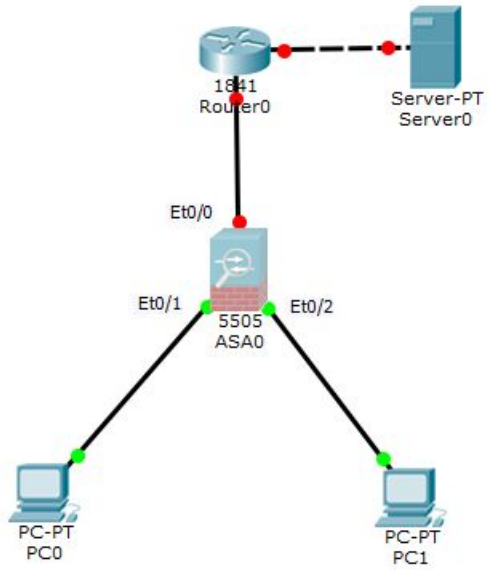
Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete

ENG 21:53 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Видим, что внешний ip-адрес ***прописан.***

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
!
interface Ethernet0/5
!
interface Ethernet0/6
!
interface Ethernet0/7
!
interface Vlan1
 nameif inside
 security-level 95
 ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
 nameif outside
 security-level 0
 ip address 210.210.0.2 255.255.255.252
!
!
!
!
!
!
aaa authentication ssh console LOCAL
!
```

Copy Paste

Time: 05:22:26 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

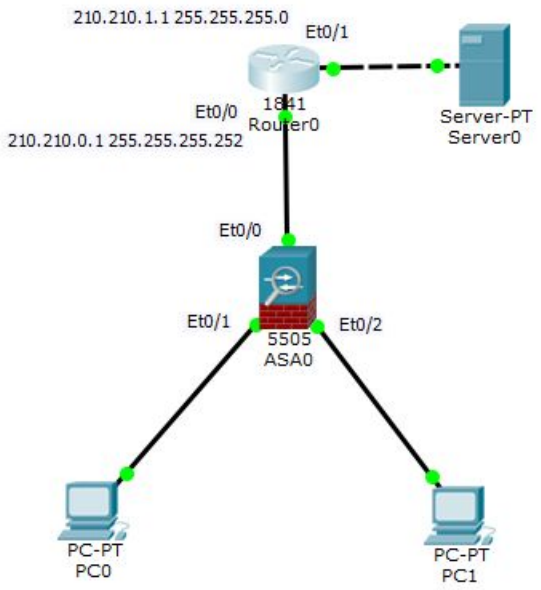
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 21:58 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Настроим маршрутизатор провайдера:

«n», «en»,
«int fa0/0»,
«ip address 210.210.0.1 255.255.255.252»,
«no shutdown»,
«exit»,
«int fa0/1»,
«ip address 210.210.1.1 255.255.255.0»,
«no shutdown»,
«end», «wr mem».

Time: 05:33:46 Power Cycle Devices Fast Forward Time

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window Fire

Router0

Physical Config CLI

IOS Command Line Interface

```
RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 04:52 by pt_team


         --- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: n


Press RETURN to get started!



Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip add
Router(config-if)#ip address 210.210.0.1 255.255.255.252
Router(config-if)#no sh
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
up

Router(config-if)#exit
Router(config)#int fa0/1
Router(config-if)#ip address 210.210.1.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to
up

Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr mem
Building configuration...
[OK]
Router#
```

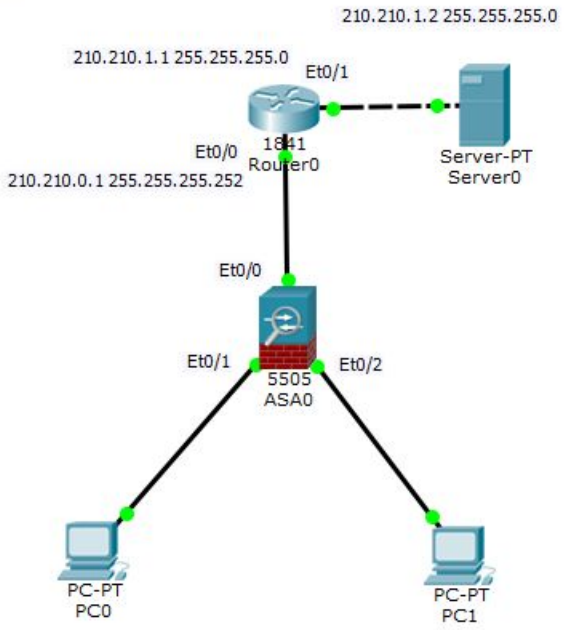
Copy Paste

ENG 22:10 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Настроим сервер.
Введём ip-адрес***,:***
«210.210.1.2»***,***
маску:
«255.255.255.0» ***и***
шлюз по умолчанию:
«210.210.1.1».

Server0

Physical | Config | Services | Desktop | Custom Interface

IP Configuration X

Interface: FastEthernet0

IP Configuration
- DHCP
- Static
- IP Address: 210.210.1.2
- Subnet Mask: 255.255.255.0
- Default Gateway: 210.210.1.1
- DNS Server:

IPv6 Configuration
- DHCP
- Auto Config
- Static
- IPv6 Address:
- Link Local Address: FE80::207:ECFF:FE91:C2EC
- IPv6 Gateway:
- IPv6 DNS Server:

Time: 05:43:49 | Power Cycle Devices | Fast Forward Time | Realtime

Connections | Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

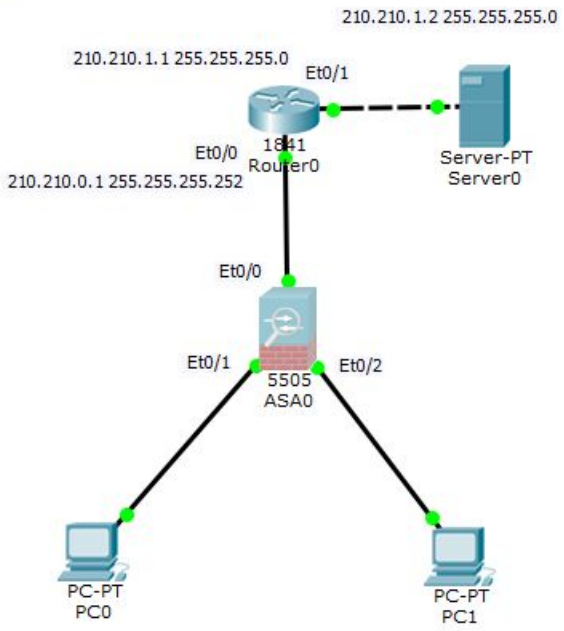
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 22:20 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Проверим связь с межсетевого экрана на маршрутизатор:

«ping 210.210.0.1».

Видим, что связь есть!

ASA0

Physical Config CLI

ASA Command Line Interface

```
telnet timeout 5
ssh 192.168.1.0 255.255.255.0 inside
ssh timeout 5
!
dhcpd address 192.168.1.5-192.168.1.35 inside
dhcpd enable inside
!
dhcpd auto_config outside
!
!
!
!
!
ciscoasa(config)#
ciscoasa(config)#ping 210.210.0.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 210.210.0.1, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/3 ms

ciscoasa(config)#
ciscoasa(config)#
```

Copy Paste

Time: 05:48:55 Power Cycle Devices Fast Forward Time

Realtime

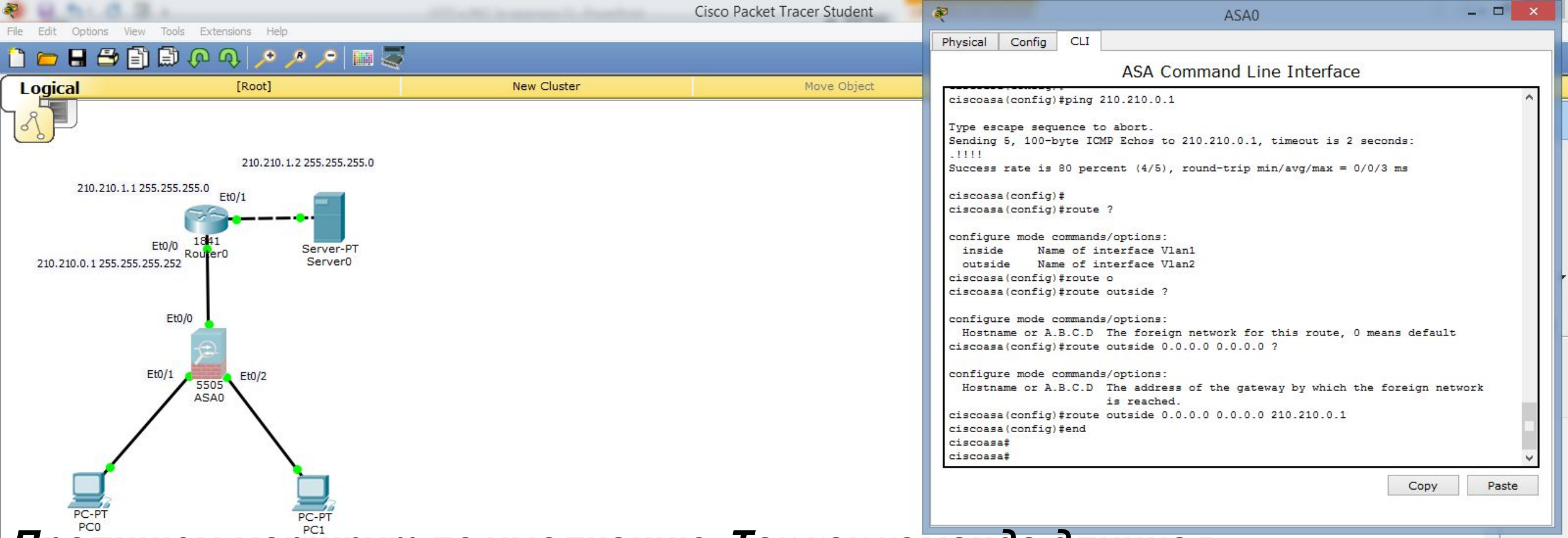
Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 22:25 11.01.2020



Пропишем маршрут по умолчанию. Так как команда длинная, для просмотра вариантов пользуемся знаком «?»***:***

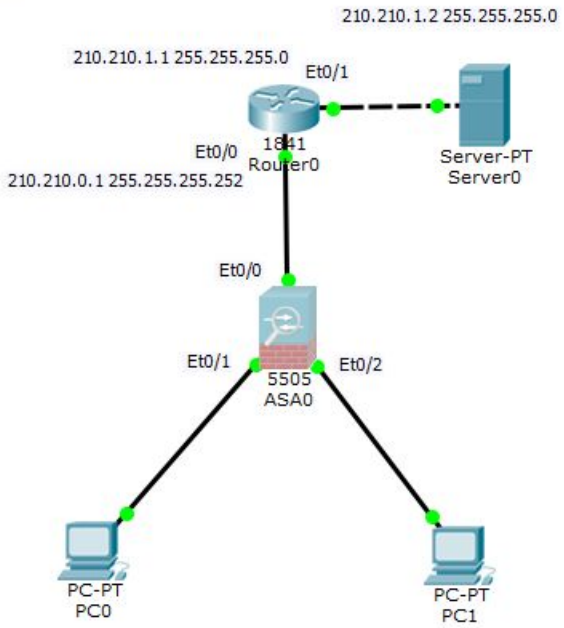
«route outside 0.0.0.0 0.0.0.0 210.210.0.1»,

«end».

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Ещё раз проверим связь с межсетевого экрана на сервер:

«ping 210.210.0.1».

Видим, что связь есть!

ASA0

Physical Config CLI

ASA Command Line Interface

```
ciscoasa(config)#route o
ciscoasa(config)#route outside ?

configure mode commands/options:
  Hostname or A.B.C.D  The foreign network for this route, 0 means default
ciscoasa(config)#route outside 0.0.0.0 0.0.0.0 ?

configure mode commands/options:
  Hostname or A.B.C.D  The address of the gateway by which the foreign network
                       is reached.
ciscoasa(config)#route outside 0.0.0.0 0.0.0.0 210.210.0.1
ciscoasa(config)#end
ciscoasa#
ciscoasa#ping 210.210.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 210.210.1.2, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/1/3 ms

ciscoasa#ping 210.210.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 210.210.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

ciscoasa#
```

Copy Paste

Time: 06:18:07 Power Cycle Devices Fast Forward Time

Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

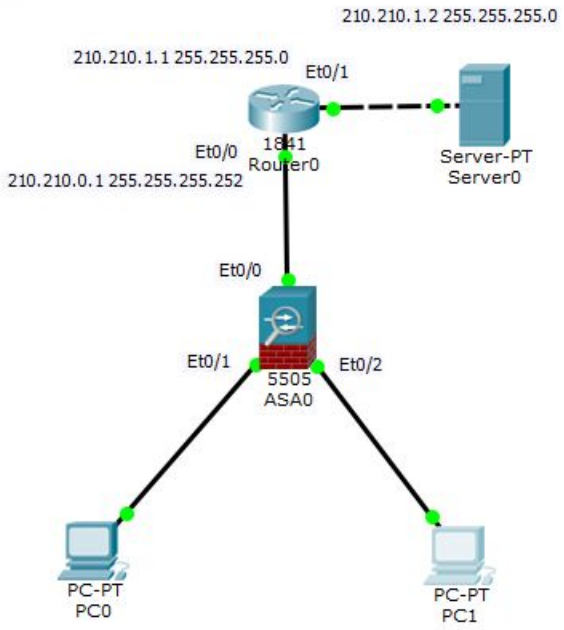
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 22:54 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Проверим связь одного из компьютеров с маршрутизатором провайдера:

«ping 210.210.0.1».

Видим, что связи нет!

PC1

Physical | Config | Desktop | Custom Interface

Command Prompt

```
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>ping 210.210.0.1

Pinging 210.210.0.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 210.210.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
PC>
PC>
PC>
PC>
PC>
```

Time: 06:28:16 | Power Cycle Devices | Fast Forward Time | Realtime

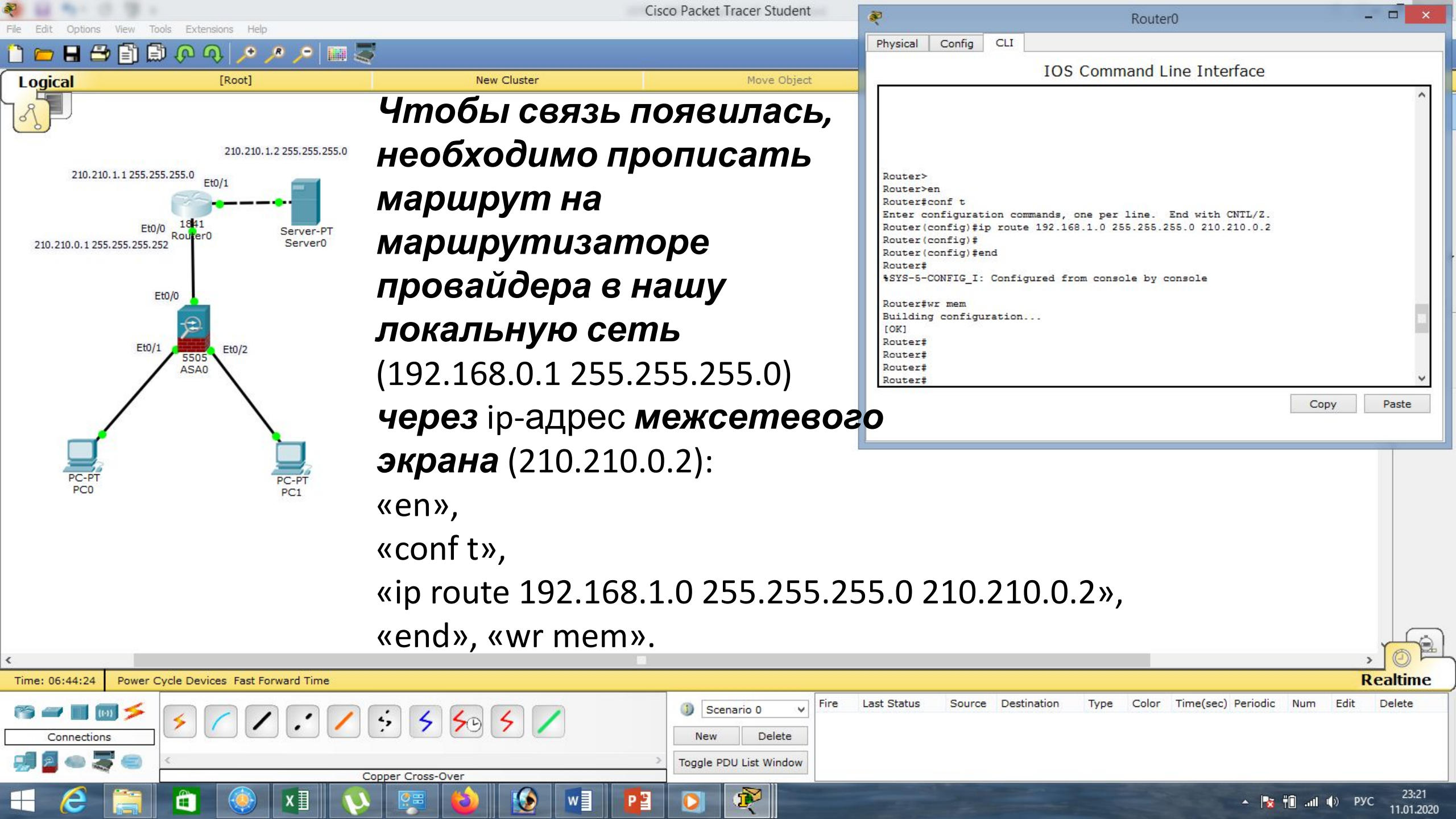
Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 23:04 11.01.2020



Чтобы связь появилась, необходимо прописать маршрут на маршрутизаторе провайдера в нашу локальную сеть (192.168.0.1 255.255.255.0) ***через*** ip-адрес ***межсетевого экрана*** (210.210.0.2):

«en»,

«conf t»,

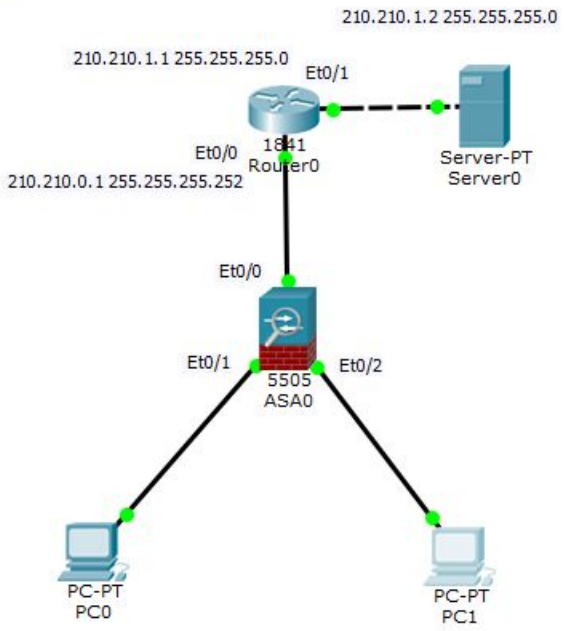
«ip route 192.168.1.0 255.255.255.0 210.210.0.2»,

«end», «wr mem».

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Ещё раз проверим связь одного из компьютеров с маршрутизатором провайдера:

«ping 210.210.0.1».

Видим, что связи нет!

Почему?

Всё дело в уровнях доверия.

ASA ***ведёт таблицу сессий.***

Уровень доверия с маршрутизатора на межсетевой экран низкий и в таблице ещё не было дано ни одного разрешения.

PC1

Physical | Config | Desktop | Custom Interface

Command Prompt

```
Pinging 210.210.0.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 210.210.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
PC>
PC>
PC>
PC>
PC>ping 210.210.0.1

Pinging 210.210.0.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 210.210.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
```

Time: 06:46:43 | Power Cycle Devices | Fast Forward Time | Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

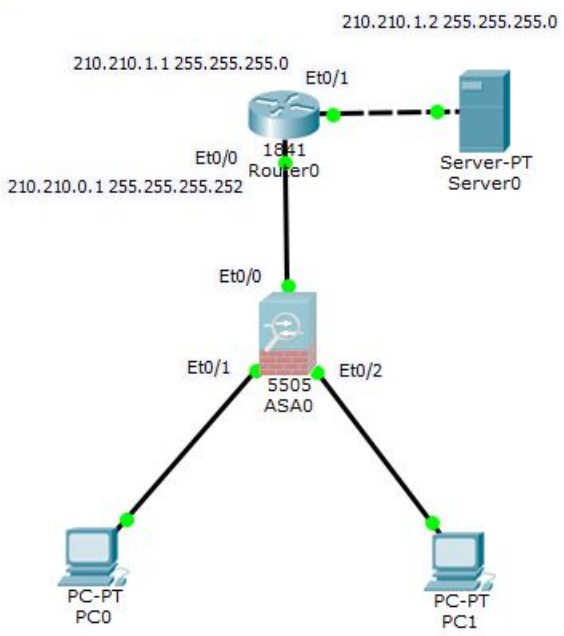
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 23:23 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



По умолчанию на ASA ***инспектирование трафика не настроено.***
Сделаем это.
Сначала определяем тип трафика, который хотим инспектировать:
«conf t»,
«class-map inspection_default»,
указываем весь трафик:
«match default-inspection-traffic»,
«exit».

ASA0

Physical Config CLI

ASA Command Line Interface

```
  Hostname or A.B.C.D  The foreign network for this route, 0 means default
ciscoasa(config)#route outside 0.0.0.0 0.0.0.0 ?

configure mode commands/options:
  Hostname or A.B.C.D  The address of the gateway by which the foreign network
                       is reached.
ciscoasa(config)#route outside 0.0.0.0 0.0.0.0 210.210.0.1
ciscoasa(config)#end
ciscoasa#
ciscoasa#ping 210.210.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 210.210.1.2, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/1/3 ms

ciscoasa#ping 210.210.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 210.210.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

ciscoasa#conf t
ciscoasa(config)#class-map inspection_default
ciscoasa(config-cmap)#match default-inspection-traffic
ciscoasa(config-cmap)#exit
ciscoasa(config)#
```

Copy Paste

Time: 07:13:04 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

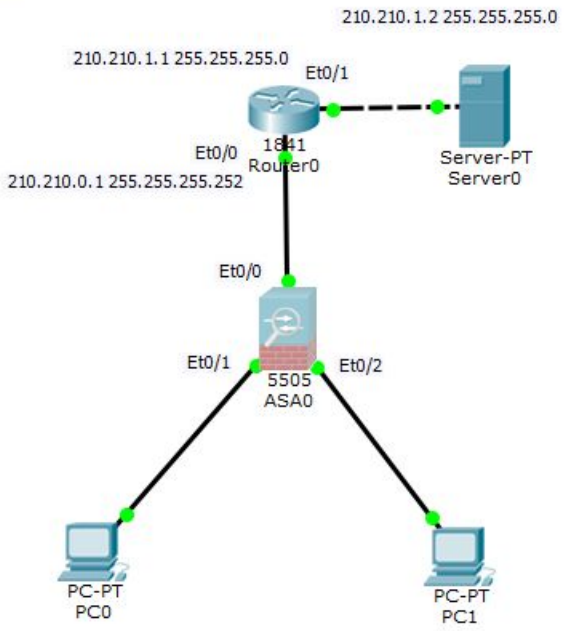
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 23:49 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Далее создаём политику (действие над трафиком):
«policy-map global_policy».
Это действие применяется к созданному нами классу:
«class inspection_default»,
нас интересует инспектирование трафика icmp ***:***
«inspect icmp»,
«exit».

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/1/3 ms

ciscoasa#ping 210.210.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 210.210.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

ciscoasa#conf t
ciscoasa(config)#class-map inspection_default
ciscoasa(config-cmap)#match default-inspection-traffic
ciscoasa(config-cmap)#exit
ciscoasa(config)#policy-map global_policy
ciscoasa(config-pmap)#class inspection_default
ciscoasa(config-pmap-c)#ciscoasa(config-pmap)#class inspection_default
                        ^
% Invalid input detected at '^' marker.

ciscoasa(config-pmap-c)#ciscoasa(config-pmap-c)#inspect icmp
                        ^
% Invalid input detected at '^' marker.

ciscoasa(config-pmap-c)#inspect icmp
ciscoasa(config-pmap-c)#
ciscoasa(config-pmap-c)#exit
ciscoasa(config)#
```

Copy | Paste

Time: 07:20:53 | Power Cycle Devices | Fast Forward Time | Realtime

Connections | Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

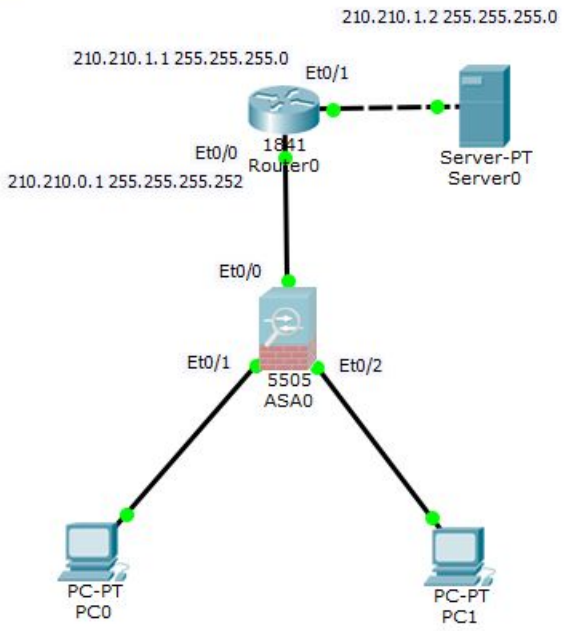
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 23:57 11.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Далее определяем, в каком направлении будем использовать политику инспектирования трафика. В нашем случае во всех направлениях:

«service-policy global_policy global»,

«end»,

«wr mem».

ASA0

Physical Config CLI

ASA Command Line Interface

```
ciscoasa(config-pmap-c)#ciscoasa(config-pmap)#class inspection_default
                                              ^
% Invalid input detected at '^' marker.

ciscoasa(config-pmap-c)#ciscoasa(config-pmap-c)#inspect icmp
                                              ^
% Invalid input detected at '^' marker.

ciscoasa(config-pmap-c)#inspect icmp
ciscoasa(config-pmap-c)#
ciscoasa(config-pmap-c)#exit
ciscoasa(config)#ciscoasa(config-pmap-c)#exit
                      ^
% Invalid input detected at '^' marker.

ciscoasa(config)#service-policy global_policy global
ciscoasa(config)#
ciscoasa(config)#
ciscoasa(config)#end
ciscoasa#wr mem
Building configuration...
Cryptochecksum: 058c285f 55e0062d 00ad1335 5d2a0add

1101  bytes copied in 2.714 secs (405 bytes/sec)
[OK]
ciscoasa#
ciscoasa#
```

Copy Paste

Time: 31:29:36 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

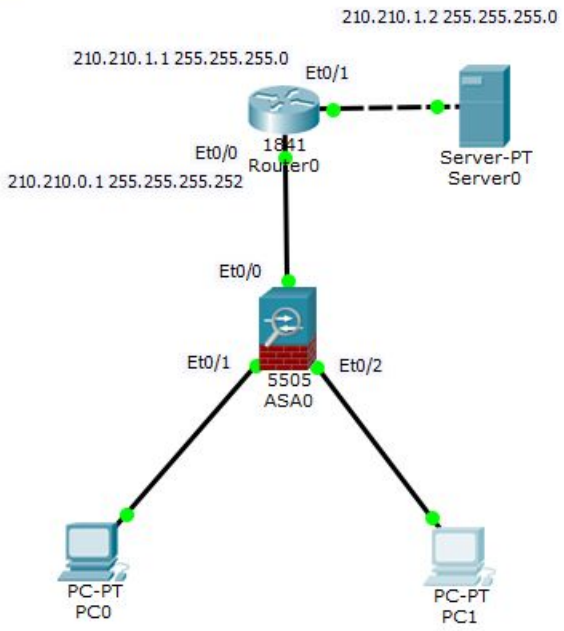
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 0:06 12.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Ещё раз проверим связь одного из компьютеров с маршрутизатором провайдера:

«ping 210.210.0.1».

Связь есть!

PC1

Physical | Config | Desktop | Custom Interface

Command Prompt

```
PC>ping 210.210.0.1

Pinging 210.210.0.1 with 32 bytes of data:

Request timed out.
Reply from 210.210.0.1: bytes=32 time=12ms TTL=254
Reply from 210.210.0.1: bytes=32 time=0ms TTL=254
Reply from 210.210.0.1: bytes=32 time=0ms TTL=254

Ping statistics for 210.210.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 12ms, Average = 4ms

PC>ping 210.210.0.1

Pinging 210.210.0.1 with 32 bytes of data:

Reply from 210.210.0.1: bytes=32 time=2ms TTL=254
Reply from 210.210.0.1: bytes=32 time=1ms TTL=254
Reply from 210.210.0.1: bytes=32 time=0ms TTL=254
Reply from 210.210.0.1: bytes=32 time=1ms TTL=254

Ping statistics for 210.210.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 1ms

PC>
```

Time: 31:33:42 | Power Cycle Devices | Fast Forward Time | Realtime

Connections | Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

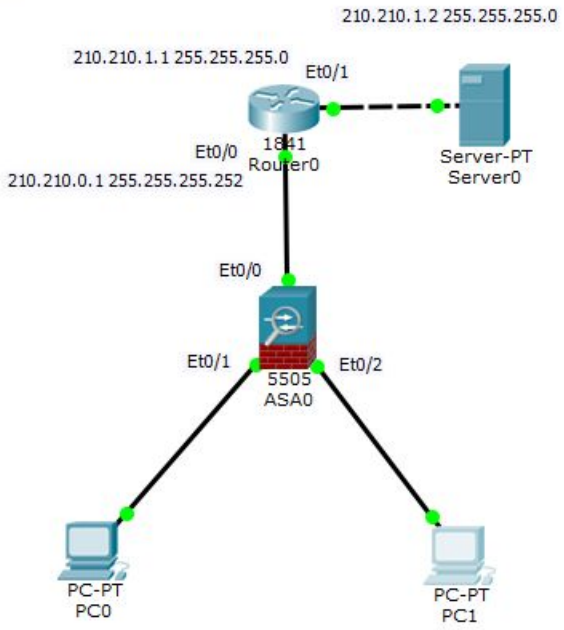
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 0:10 12.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Проверим связь одного из компьютеров с сервером:

«ping 210.210.1.2».

Связь есть!

PC1

Physical | Config | Desktop | Custom Interface

Command Prompt

```
PC>ping 210.210.1.2

Pinging 210.210.1.2 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 210.210.1.2: bytes=32 time=0ms TTL=126
Reply from 210.210.1.2: bytes=32 time=0ms TTL=126

Ping statistics for 210.210.1.2:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>ping 210.210.1.2

Pinging 210.210.1.2 with 32 bytes of data:

Reply from 210.210.1.2: bytes=32 time=2ms TTL=126
Reply from 210.210.1.2: bytes=32 time=4ms TTL=126
Reply from 210.210.1.2: bytes=32 time=1ms TTL=126
Reply from 210.210.1.2: bytes=32 time=1ms TTL=126

Ping statistics for 210.210.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 4ms, Average = 2ms

PC>
```

Time: 31:38:37 | Power Cycle Devices | Fast Forward Time | Realtime

Connections | Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

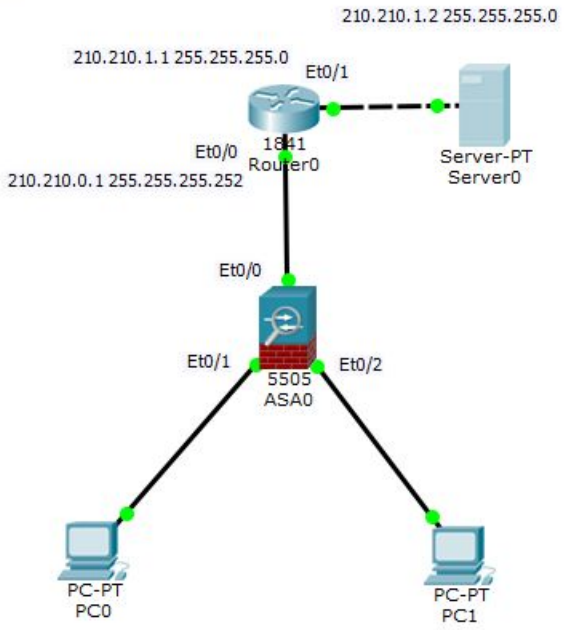
РУС 0:15 12.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object

Проверим Web-сервер (HTTP).
Сервер включен.



Server0

Physical | Config | Services | Desktop | Custom Interface

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP

HTTP

HTTP: On / Off

HTTPS: On / Off

File Manager

	File Name	Edit	Delete
1	copyrights.html	(edit)	(delete)
2	cscoptlogo177x...		(delete)
3	helloworld.html	(edit)	(delete)
4	image.html	(edit)	(delete)
5	index.html	(edit)	(delete)

New File | Import

Time: 31:40:53 | Power Cycle Devices | Fast Forward Time

Realtime

Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

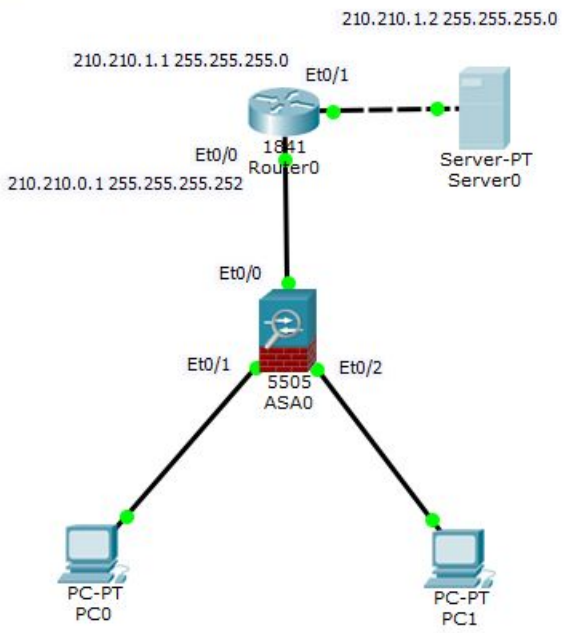
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 0:17 12.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Пробуем войти на Web-сервер .
Не работает.
Почему?

Мы инспектируем на ASA ***только*** icmp-трафик ***трафик.***

Чтобы заработал Web-сервер нужно ещё инспектировать HTTP-трафик***.***

PC1

Physical | Config | Desktop | Custom Interface

Web Browser

< > URL http://210.210.1.2 Go Stop

Request Timeout

Time: 31:46:19 | Power Cycle Devices | Fast Forward Time | Realtime

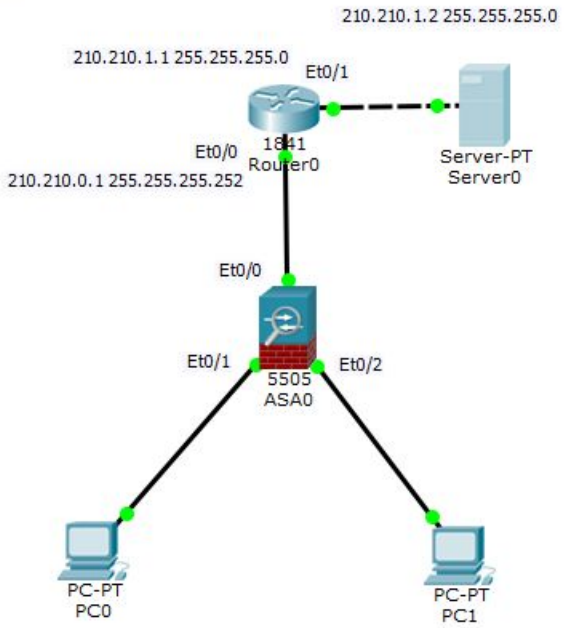
Connections

Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 0:23 12.01.2020



Сделаем это.
Войдём в настройки ASA
:

«conf t»,
«policy-map global_policy»,
«class inspection_default»,
«inspect http»,
«end»,
«wr mem».

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object

ASA0

Physical Config CLI

ASA Command Line Interface

```
ciscoasa(config)#
ciscoasa(config)#end
ciscoasa#wr mem
Building configuration...
Cryptochecksum: 058c285f 55e0062d 00ad1335 5d2a0add

1101  bytes copied in 2.714 secs (405 bytes/sec)
[OK]
ciscoasa#
ciscoasa#conf t
ciscoasa(config)#policy-map global_policy
ciscoasa(config-pmap)#
ciscoasa(config-pmap)#class inspection_default
ciscoasa(config-pmap-c)#
ciscoasa(config-pmap-c)#inspect http
ciscoasa(config-pmap-c)#
ciscoasa(config-pmap-c)#end
ciscoasa#
ciscoasa#wr mem
Building configuration...
Cryptochecksum: 058c285f 55e0062d 00ad1335 5d2a0add

1116  bytes copied in 1.36 secs (820 bytes/sec)
[OK]
ciscoasa#
ciscoasa#
```

Copy Paste

Time: 31:55:48 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

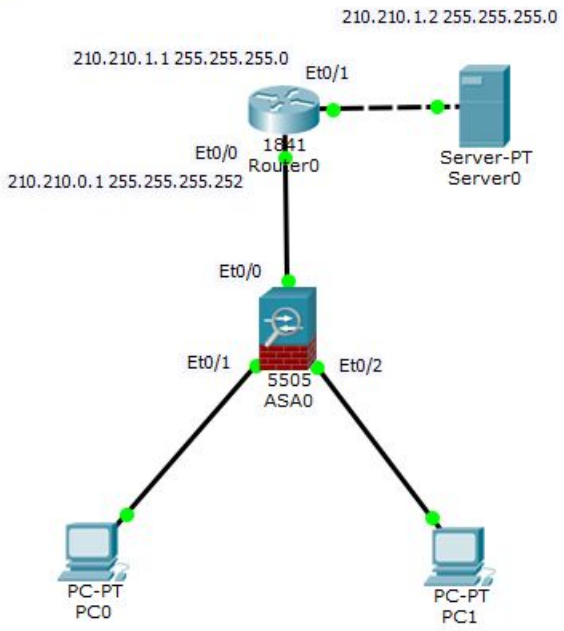
Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete

ENG 0:32 12.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Ещё раз пробуем войти на Web-сервер .

Связь появилась!!!

PC1

Physical Config Desktop Custom Interface

Web Browser X

< > URL http://210.210.1.2 Go Stop

Cisco Packet Tracer

Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.

Quick Links:
A small page
Copyrights
Image page
Image

Time: 32:01:43 Power Cycle Devices Fast Forward Time Realtime

Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

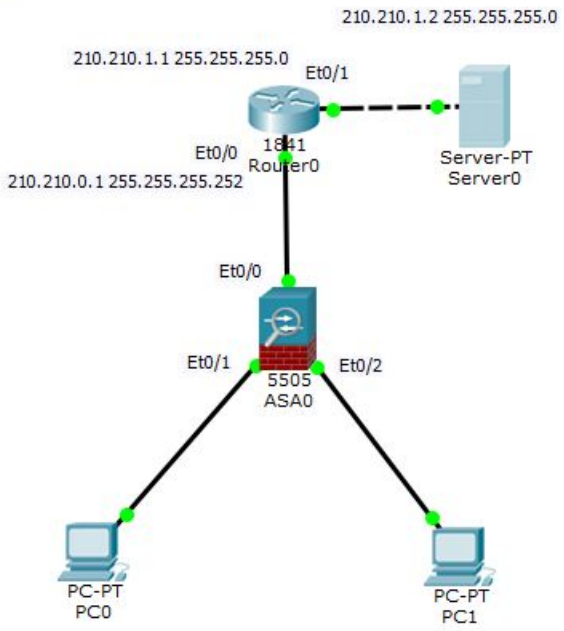
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 0:38 12.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object



Проверим связь с сервера к одному из компьютеров:
«ping 192.168.1.5».
Связи нет и не будет, так как уровень доверия на вход извне в нашу сеть очень низкий.
ASA ***этот трафик не пропускает, если только мы не пропишем явный*** Access List.
Это одно из преимуществ сетевых экранов!!!

Server0

Physical Config Services Desktop Custom Interface

Command Prompt X

```
Packet Tracer SERVER Command Line 1.0
SERVER>ping 192.168.1.5

Pinging 192.168.1.5 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.5:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

SERVER>
```

Time: 32:10:02 Power Cycle Devices Fast Forward Time

Realtime

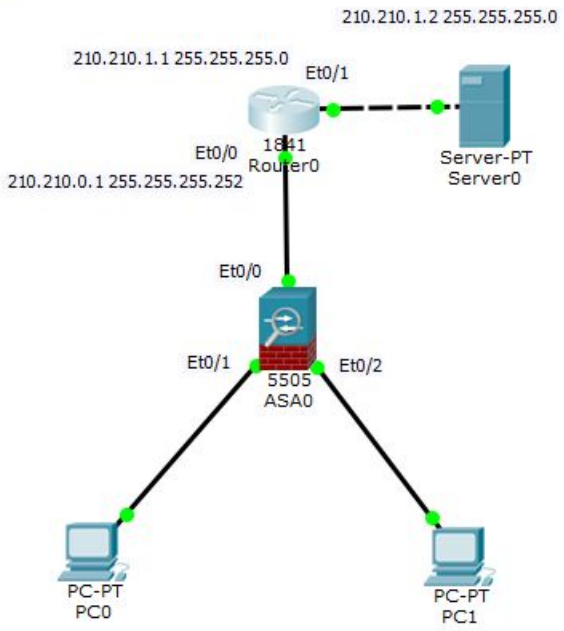
Connections

Copper Cross-Over

Scenario 0 New Delete Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

ENG 0:47 12.01.2020



Рассмотрим настройку NAT ***на*** Cisco ASA***. Она существенно отличается от настройки на маршрутизаторе. Для этого сначала мы удалим на маршрутизаторе провайдера, созданный ранее маршрут в нашу сеть:***

«no ip route 192.168.1.0 255.255.255.0 210.210.0.2»,

«end»,

«wr mem».

Router0

Physical | Config | CLI

IOS Command Line Interface

```
Press RETURN to get started.



Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#no ip route 192.168.1.0 255.255.255.0 210.210.0.2
Router(config)#
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr mem
Building configuration...
[OK]
Router#
Router#
```

Copy | Paste

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object

Time: 32:18:02 | Power Cycle Devices | Fast Forward Time | Realtime

Connections | Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

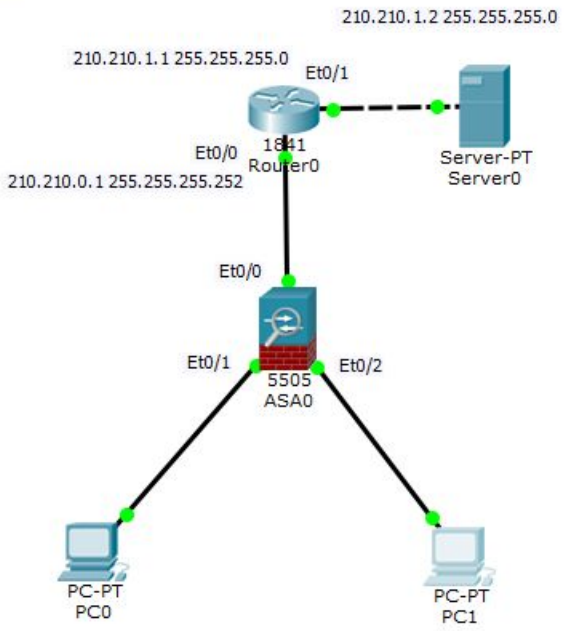
Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete

ENG 0:55 12.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



Теперь на компьютерах должна пропасть связь с сервером:

«ping 210.210.1.2».

Связи нет.

PC1

Physical | Config | Desktop | Custom Interface

Command Prompt

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>ping 210.210.1.2

Pinging 210.210.1.2 with 32 bytes of data:

Reply from 210.210.1.2: bytes=32 time=2ms TTL=126
Reply from 210.210.1.2: bytes=32 time=4ms TTL=126
Reply from 210.210.1.2: bytes=32 time=1ms TTL=126
Reply from 210.210.1.2: bytes=32 time=1ms TTL=126

Ping statistics for 210.210.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 4ms, Average = 2ms

PC>ping 210.210.1.2

Pinging 210.210.1.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 210.210.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
```

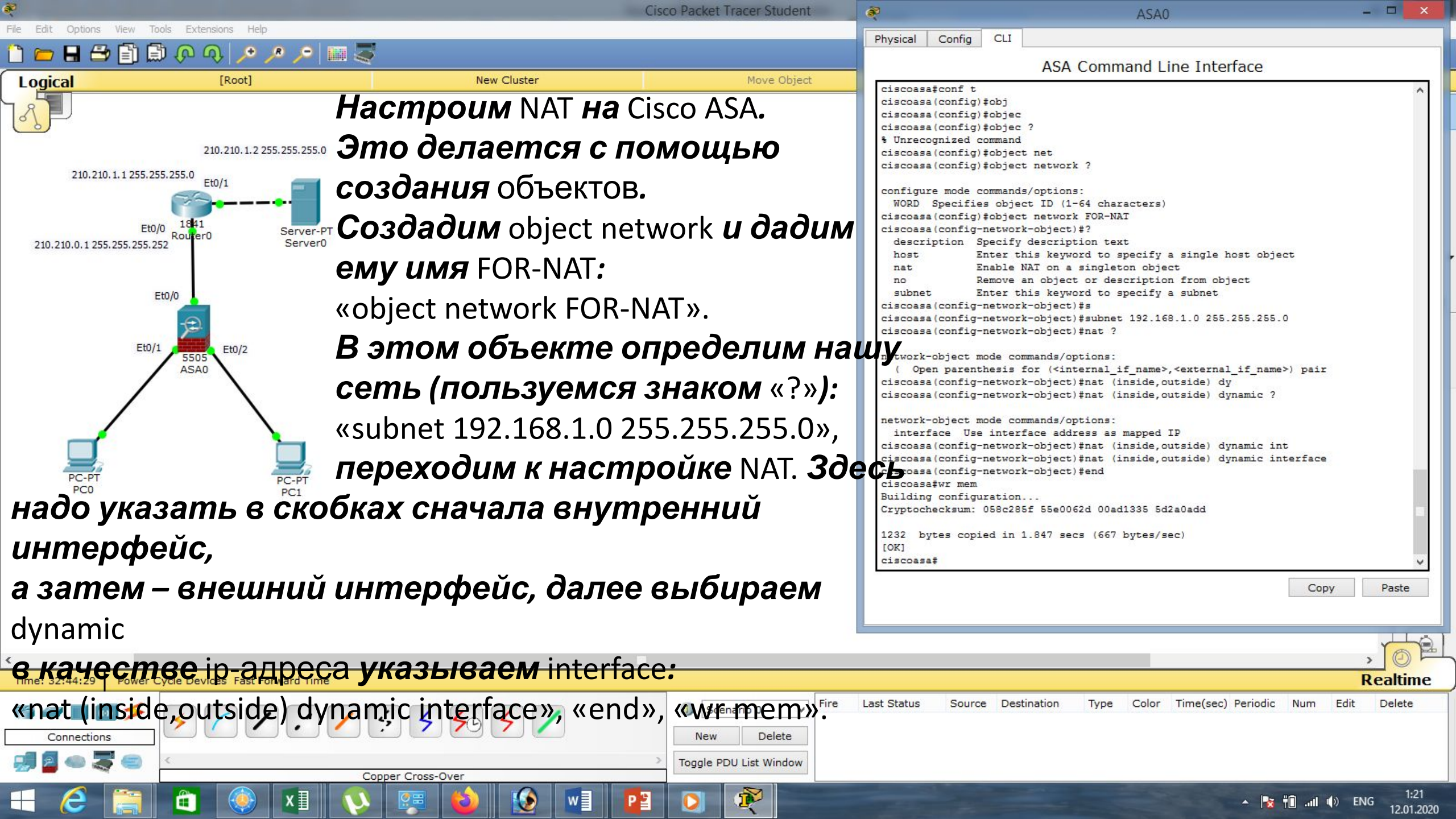
Time: 32:22:40 | Power Cycle Devices | Fast Forward Time | Realtime

Connections | Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 0:59 12.01.2020

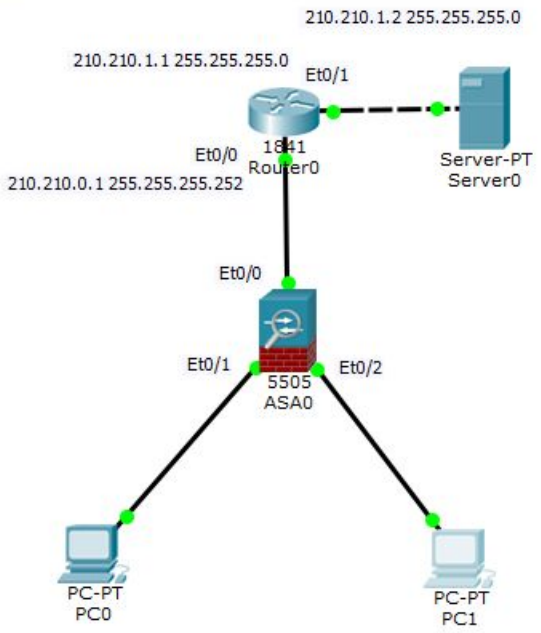


Настроим NAT ***на*** Cisco ASA***.***
Это делается с помощью создания объектов***.***
Создадим object network ***и дадим ему имя*** FOR-NAT***:***
«object network FOR-NAT».
В этом объекте определим нашу сеть (пользуемся знаком «?»***):***
«subnet 192.168.1.0 255.255.255.0»,
переходим к настройке NAT. ***Здесь надо указать в скобках сначала внутренний интерфейс,***
а затем – внешний интерфейс, далее выбираем dynamic
в качестве ip-адреса ***указываем*** interface***:***
«nat (inside,outside) dynamic interface», «end», «wr mem».

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



На этом настройка NAT Завершилась.

Проверим связь компьютер с сервером:

«ping 210.210.1.2».

Связь появилась!!!

PC1

Physical | Config | Desktop | Custom Interface

Command Prompt

```
    Minimum = 1ms, Maximum = 4ms, Average = 2ms

PC>ping 210.210.1.2

Pinging 210.210.1.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 210.210.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>ping 210.210.1.2

Pinging 210.210.1.2 with 32 bytes of data:

Reply from 210.210.1.2: bytes=32 time=15ms TTL=126
Reply from 210.210.1.2: bytes=32 time=0ms TTL=126
Reply from 210.210.1.2: bytes=32 time=11ms TTL=126
Reply from 210.210.1.2: bytes=32 time=0ms TTL=126

Ping statistics for 210.210.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 15ms, Average = 6ms

PC>
```

Time: 32:54:27 | Power Cycle Devices | Fast Forward Time | Realtime

Connections | Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

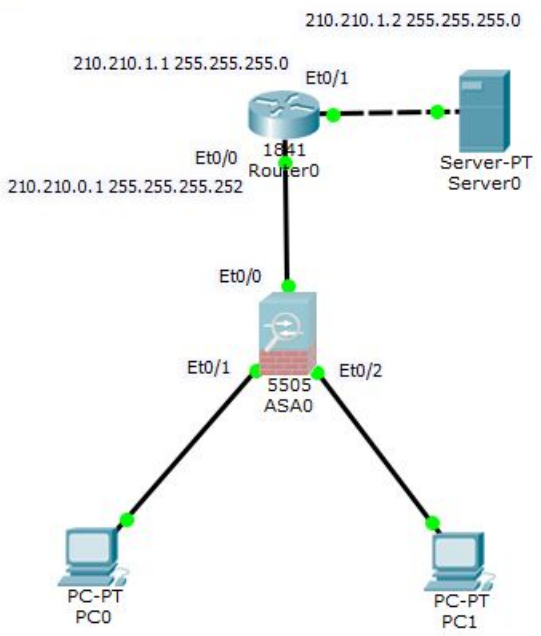
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 1:31 12.01.2020

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical | [Root] | New Cluster | Move Object



На Cisco ASA ***наберём команду:***

«show nat».

Видим счётчик пакетов, которые прошли через NAT.

ASA0

Physical | Config | CLI

ASA Command Line Interface

```
ciscoasa(config-network-object)#nat ?

network-object mode commands/options:
  (  Open parenthesis for (<internal_if_name>,<external_if_name>) pair
ciscoasa(config-network-object)#nat (inside,outside) dy
ciscoasa(config-network-object)#nat (inside,outside) dynamic ?

network-object mode commands/options:
  interface  Use interface address as mapped IP
ciscoasa(config-network-object)#nat (inside,outside) dynamic int
ciscoasa(config-network-object)#nat (inside,outside) dynamic interface
ciscoasa(config-network-object)#end
ciscoasa#wr mem
Building configuration...
Cryptochecksum: 058c285f 55e0062d 00ad1335 5d2a0add

1232  bytes copied in 1.847 secs (667 bytes/sec)
[OK]
ciscoasa#show nat
Auto NAT Policies (Section 2)
1 (inside) to (outside) source dynamic FOR-NAT interface
    translate_hits = 12, untranslate_hits = 12

ciscoasa#
```

Copy | Paste

На этом краткое знакомство с межсетевым экраном Cisco ASA ***закончено!***

Time: 33:01:32 | Power Cycle Devices | Fast Forward Time | Realtime

Connections | Copper Cross-Over

Scenario 0 | New | Delete | Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

РУС 1:39 12.01.2020

Маска подсети	Маска в двоичной системе	Префикс	Количество адресов	Обратная маска
255.255.255.255	11111111.11111111.11111111.11111111	/32	1	0.0.0.0
255.255.255.254	11111111.11111111.11111111.11111110	/31	2	0.0.0.1
255.255.255.252	11111111.11111111.11111111.11111100	/30	4	0.0.0.3
255.255.255.248	11111111.11111111.11111111.11111000	/29	8	0.0.0.7
255.255.255.240	11111111.11111111.11111111.11110000	/28	16	0.0.0.15
255.255.255.224	11111111.11111111.11111111.11100000	/27	32	0.0.0.31
255.255.255.192	11111111.11111111.11111111.11000000	/26	64	0.0.0.63
255.255.255.128	11111111.11111111.11111111.10000000	/25	128	0.0.0.127
255.255.255.0	11111111.11111111.11111111.00000000	/24	256	0.0.0.255
255.255.254.0	11111111.11111111.11111110.00000000	/23	512	0.0.1.255
255.255.252.0	11111111.11111111.11111100.00000000	/22	1024	0.0.3.255
255.255.248.0	11111111.11111111.11111000.00000000	/21	2048	0.0.7.255
255.255.240.0	11111111.11111111.11110000.00000000	/20	4096	0.0.15.255
255.255.224.0	11111111.11111111.11100000.00000000	/19	8192	0.0.31.255
255.255.192.0	11111111.11111111.11000000.00000000	/18	16384	0.0.63.255
255.255.128.0	11111111.11111111.10000000.00000000	/17	32768	0.0.127.255
255.255.0.0	11111111.11111111.00000000.00000000	/16	65536	0.0.255.255
255.254.0.0	11111111.11111110.00000000.00000000	/15	131072	0.1.255.255
255.252.0.0	11111111.11111100.00000000.00000000	/14	262144	0.3.255.255
255.248.0.0	11111111.11111000.00000000.00000000	/13	524288	0.7.255.255
255.240.0.0	11111111.11110000.00000000.00000000	/12	1048576	0.15.255.255

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