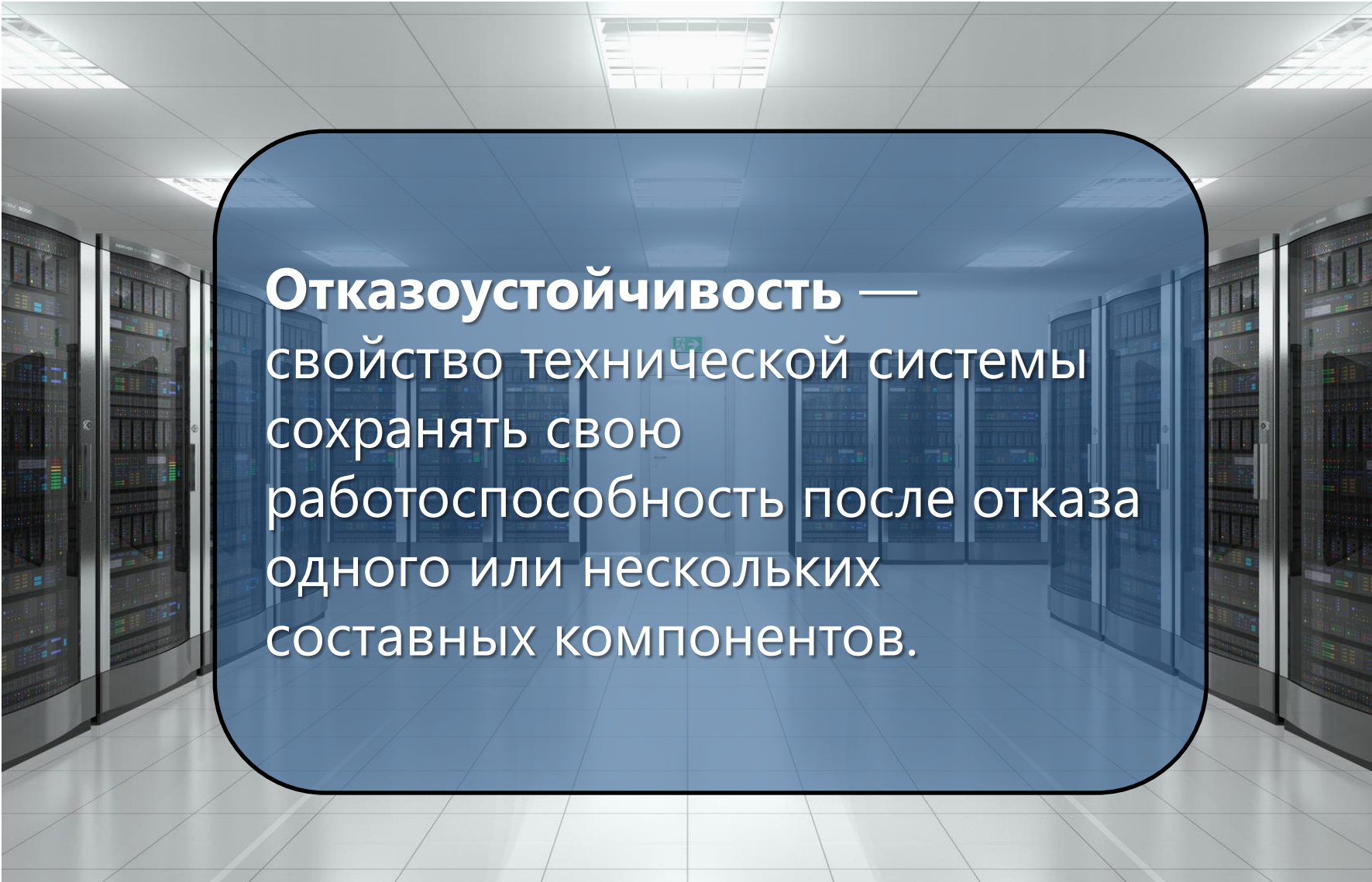
A person in a dark suit and blue tie is holding a large, silver, 3D-rendered gear. In the background, a complex assembly of many smaller gears is visible, creating a sense of depth and mechanical complexity. The overall image has a blue and grey color palette.

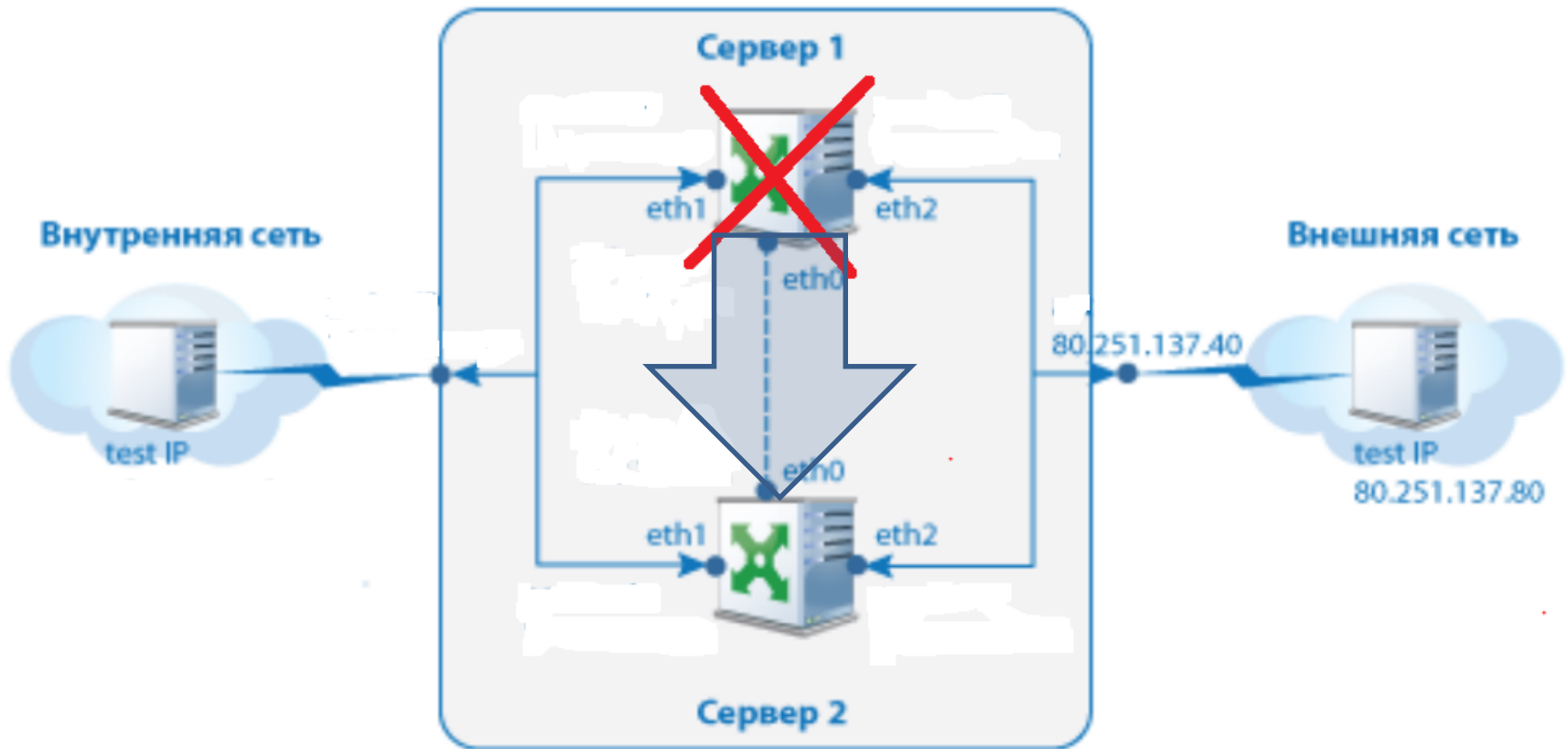
Программно-аппаратные шлюзы безопасности семейства HW. Настройка отказоустойчивости

Отдел технического сопровождения ОАО «ИнфоТекС»

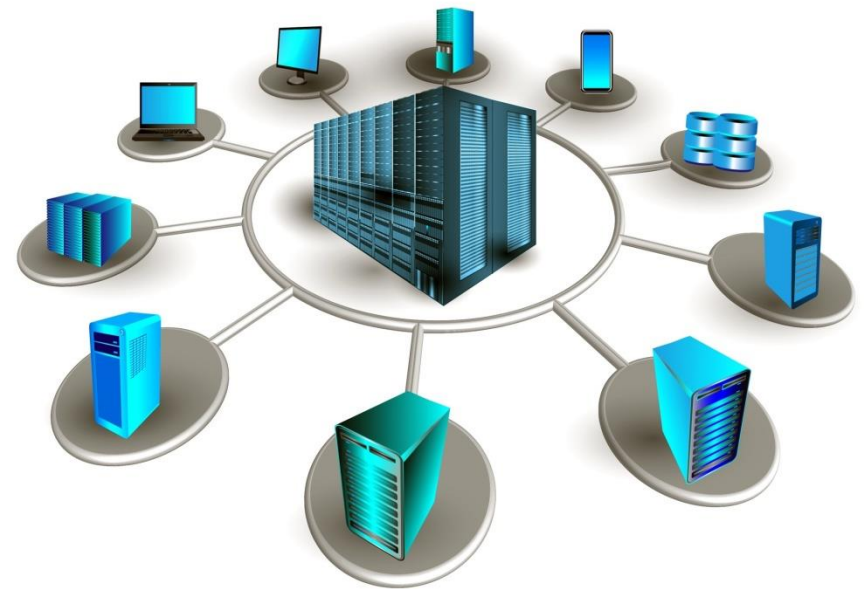
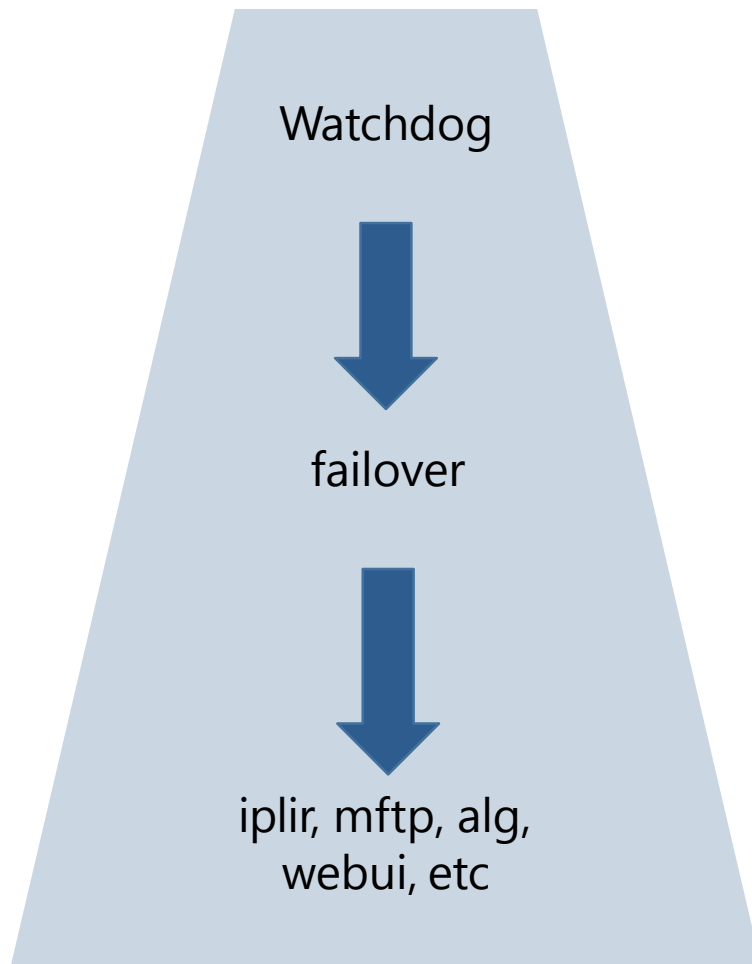
A photograph of a server room with rows of server racks on both sides, illuminated by overhead lights. A large, semi-transparent blue rounded rectangle is overlaid in the center, containing white text.

Отказоустойчивость —
свойство технической системы
сохранять свою
работоспособность после отказа
одного или нескольких
составных компонентов.

Схема кластеризации Active / Passive



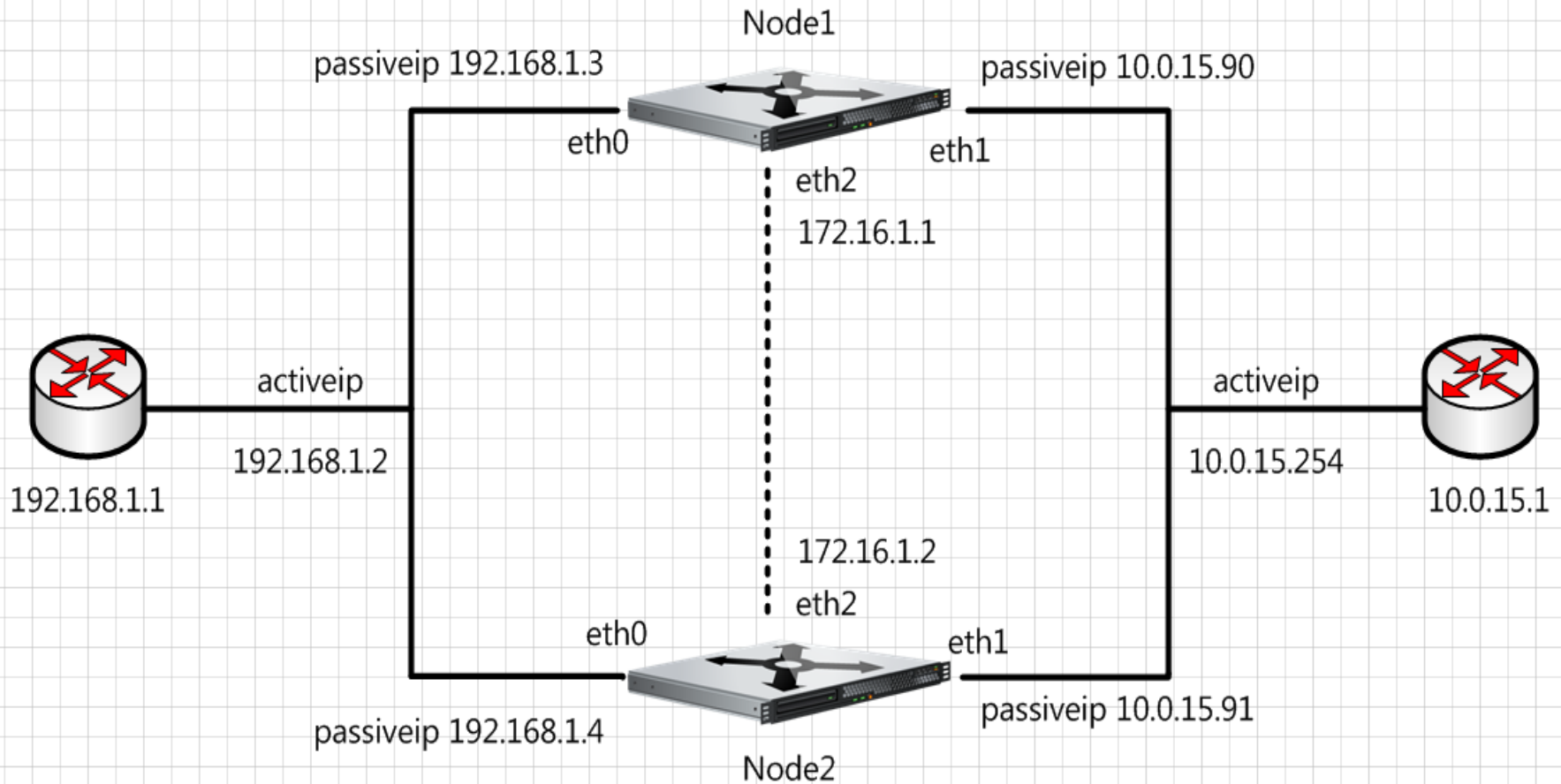
Как устроен failover?



Режимы работы системы защиты от сбоев

	Single	Cluster
HW50	+	-
HW100	+	-
HW1000	+	+
HW2000	+	+
HW5000	+	+
HW-VA	+	+

Типовая схема организации кластера



Рекомендации по настройке:

```

HW-UA# failover show config
[network]
checktime = 10
timeout = 2
activeretries = 3
channelretries = 3
synctime = 5
fastdown = yes

[channel]
device = eth0 # eth0.15 / eth0:2 / bond0
activeip = 192.168.1.2
passiveip = 192.168.1.3
testip = 192.168.1.1
ident = iface-0
checkonlyidle = yes

[channel]
device = eth1
activeip = 10.0.15.254
passiveip = 10.0.15.90
testip = 10.0.15.1
ident = if-1
checkonlyidle = yes

[sendconfig]
activeip = 172.16.1.2
sendtime = 60
device = eth2
keys = yes
config = yes
journals = yes
port = 10090

[misc]
activeconfig = /etc/iplirpsw
passiveconfig = /etc/iplirpsw
reboot = yes

[debug]
debuglevel = 3
debuglogfile = syslog:daemon.debug

```

```

HW-UA# failover show co
[network]
checktime = 10
timeout = 2
activeretries = 3
channelretries = 3
synctime = 5
fastdown = yes

[channel]
device = eth0 # eth0.15 / eth0:2 / bond0
activeip = 192.168.1.2
passiveip = 192.168.1.4
testip = 192.168.1.1
ident = iface-0
checkonlyidle = yes

[channel]
device = eth1
activeip = 10.0.15.254
passiveip = 10.0.15.91
testip = 10.0.15.1
ident = if-1
checkonlyidle = yes

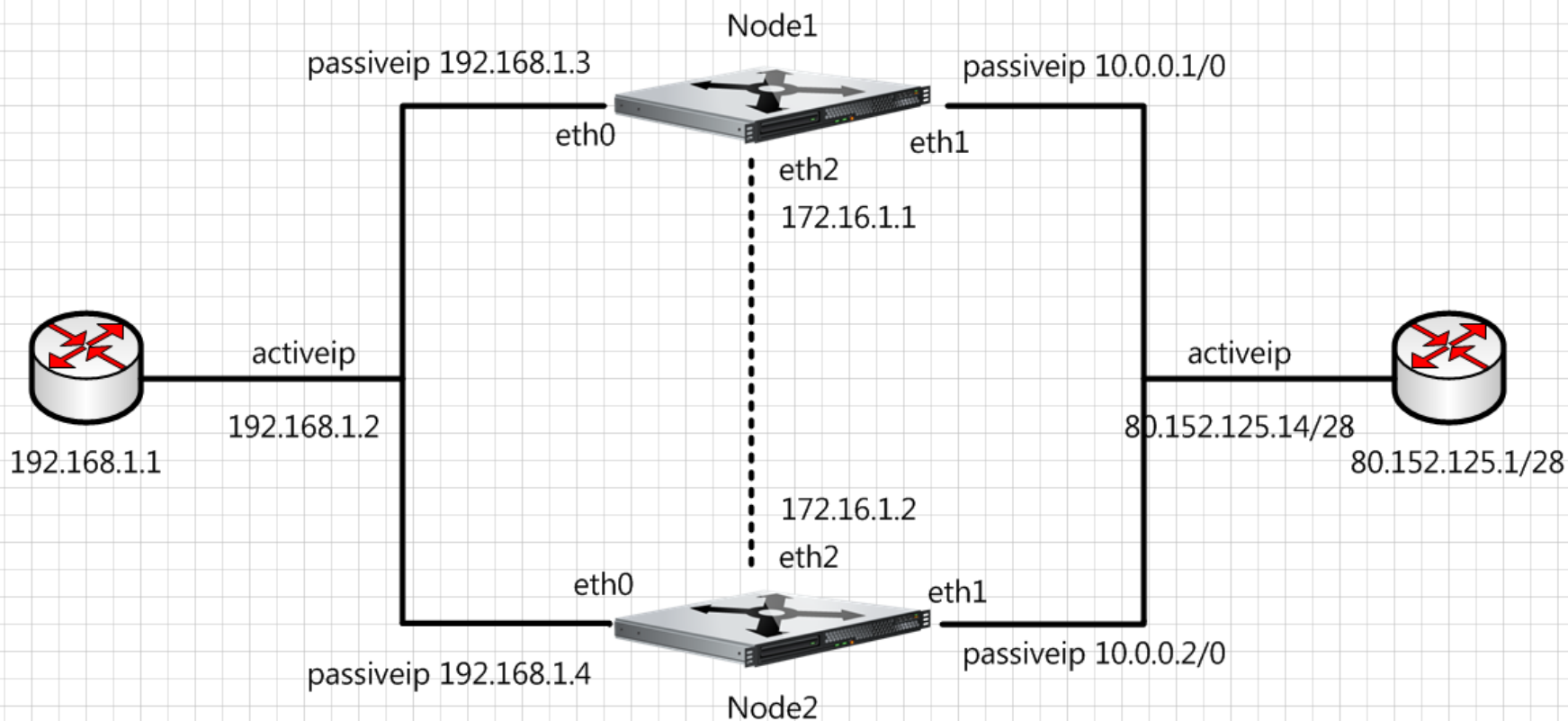
[sendconfig]
activeip = 172.16.1.1
sendtime = 60
device = eth2
keys = yes
config = yes
journals = yes
port = 10090

[misc]
activeconfig = /etc/iplirpsw
passiveconfig = /etc/iplirpsw
reboot = yes

[debug]
debuglevel = 3
debuglogfile = syslog:daemon.debug

```

Схема организации кластера с ограничение по выделению ip адресов.



Рекомендации по настройке:

```
[network]
checktime = 10
timeout = 2
activeretries = 3
channelretries = 3
synctime = 5
fastdown = yes
beforeifconf = /sbin/change_route.sh
afterifconf = /sbin/change_route.sh

[channel]
device = eth0
ident = iface-0
activeip = 192.168.0.2
passiveip = 192.168.0.3
testip = 192.168.0.1
checkonlyidle = yes

[channel]
device = eth1
ident = iface-1
activeip = 80.152.125.14/28
passiveip = 10.0.0.1/0
testip = 80.152.125.1
checkonlyidle = yes

[sendconfig]
activeip = 172.16.0.2
sendtime = 60
device = eth2
config = yes
keys = yes
journals = yes
port = 10090

[misc]
activeconfig = /etc/iplirpsw
passiveconfig = /etc/iplirpsw
maxjournal = 30 #days
reboot = yes

[debug]
debuglevel = 3
debuglogfile = syslog:daemon.debug

[events]
```

```
[network]
checktime = 10
timeout = 2
activeretries = 3
channelretries = 3
synctime = 5
fastdown = yes
beforeifconf = /sbin/change_route.sh
afterifconf = /sbin/change_route.sh

[channel]
device = eth0
ident = iface-0
activeip = 192.168.0.2
passiveip = 192.168.0.4
testip = 192.168.0.1
checkonlyidle = yes

[channel]
device = eth1
ident = iface-1
activeip = 80.152.125.14/28
passiveip = 10.0.0.2/0
testip = 80.152.125.1
checkonlyidle = yes

[sendconfig]
activeip = 172.16.0.1
sendtime = 60
device = eth2
config = yes
keys = yes
journals = yes
port = 10090

[misc]
activeconfig = /etc/iplirpsw
passiveconfig = /etc/iplirpsw
maxjournal = 30 #days
reboot = yes

[debug]
debuglevel = 3
debuglogfile = syslog:daemon.debug

[events]
```

```
Versions: ViPNet 4.2.0 (30), daemon 1.5 (1)
Workstation configured for ID 29A0022 (Coordinator_HW)
Workstation works in a cluster mode of protection against failures
Workstation time (utc: 1204638024) Mon Mar 27 17:35:30 2014

* local      * remote
failover mode * active     * passive
failover uptime * 3d 5:26   * 0d 0:00
total cpu      * 80%       * 0%
total memory  * 2044104 kB * 2044104 kB
free memory   * 1672360 kB * 1672360 kB
failover state * works     * works
failover cpu  * 7%        * 0%
iplir state   * works     * works
iplir cpu     * 0%        * 0%
mftp state    * works     * works
mftp cpu      * 66%       * 0%
alg state     * works     * stopped
alg cpu       * 35%       * 0%
webgui state  * works     * stopped
webgui cpu    * 0%        * 0%
```

Основные неисправности

Активная нода «не видит» пассивную

Циклическая перезагрузка пассивной ноды

Циклическая перезагрузка обеих нод

Пассивная нода не перешла в активный режим

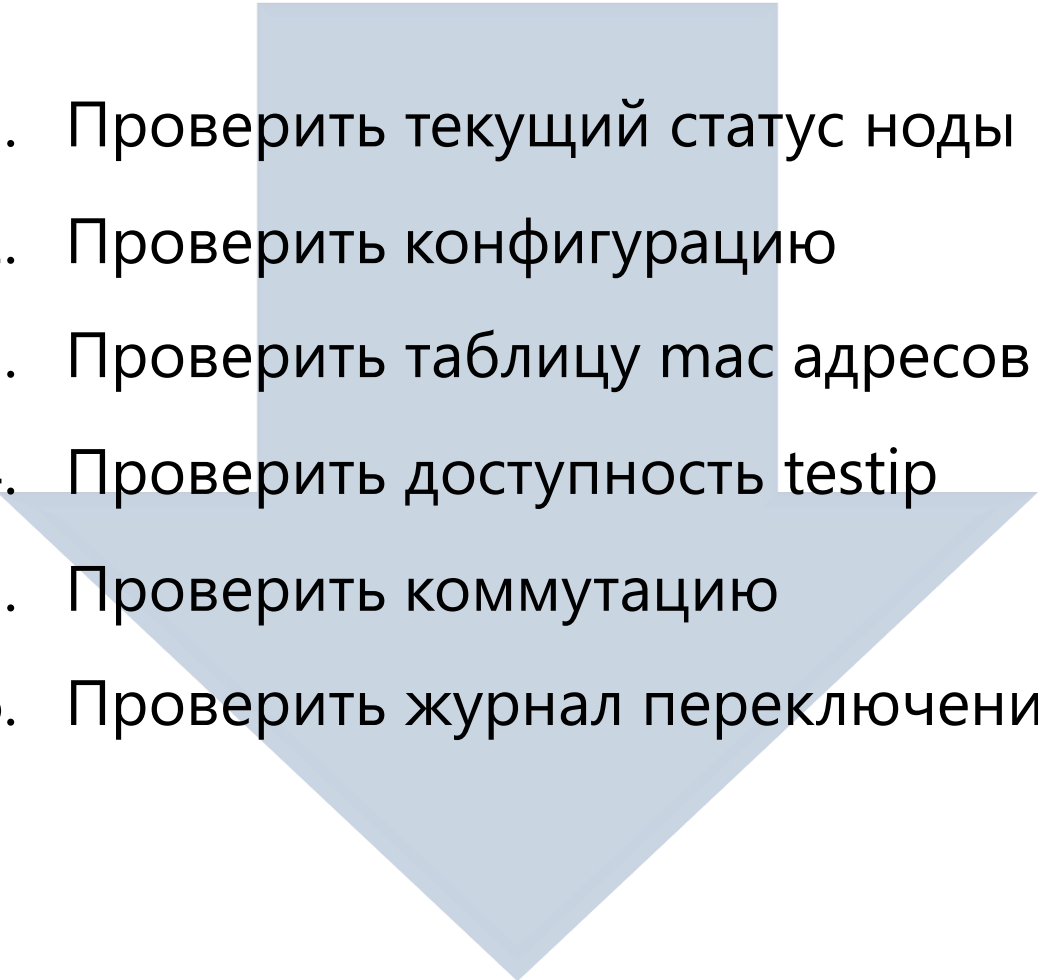
```

HW1000Services# failover show info
Running failover info
Versions: VipNet 4.2.1 (2081), daemon 1.5 (1)
Workstation configured for ID 1ACC4E2D (HW1000 Services)
The workstation works in a cluster mode of protection against failures
Workstation time (utc: 1496242841) Wed May 31 18:00:41 2017

failover mode      * local          * remote
failover mode      * active         * unknown
failover uptime    * 8d 5:17        * 0d 0:00
total cpu          * 1%             * 0%
total memory       * 2044320 kB     * 0 kB
free memory        * 1692336 kB     * 0 kB
failover state     * works          * unknown
failover cpu       * 1%             * 0%
iplir state        * works          * unknown
iplir cpu          * 1%             * 0%
mftp state         * works          * unknown
mftp cpu           * 1%             * 0%
alg state          * works          * unknown
alg cpu            * 0%             * 0%
webgui state       * works          * unknown
webgui cpu         * 0%             * 0%
HW1000Services# _

```

Диагностика неисправности

- 
- A large, light blue arrow pointing downwards, serving as a background for the list of diagnostic steps.
1. Проверить текущий статус ноды
 2. Проверить конфигурацию
 3. Проверить таблицу mac адресов
 4. Проверить доступность testip
 5. Проверить коммутацию
 6. Проверить журнал переключений

Проверка текущего статуса ноды

```

Versions: ViPNet 4.2.0 (30), daemon 1.5 (1)
Workstation configured for ID 29A0022 (Coordinator_HW)
Workstation works in a cluster mode of protection against failures
Workstation time (utc: 1204638024) Mon Mar 27 17:35:30 2014

```

	* local	* remote
failover mode	* active	* passive
failover uptime	* 3d 5:26	* 0d 0:00
total cpu	* 80%	* 0%
total memory	* 2044104 kB	* 2044104 kB
free memory	* 1672360 kB	* 1672360 kB
failover state	* works	* works
failover cpu	* 7%	* 0%
iplir state	* works	* works
iplir cpu	* 0%	* 0%
mftp state	* works	* works
mftp cpu	* 66%	* 0%
alg state	* works	* stopped
alg cpu	* 35%	* 0%
webgui state	* works	* stopped
webgui cpu	* 0%	* 0%

Проверка конфигурации

```
HW1000Services# failover show config
[network]
checktime = 10
timeout = 2
activeretries = 3
channelretries = 3
synctime = 5
fastdown = yes

[channel1]
device = eth2
ident = iface-2
activeip = 192.168.0.4
passiveip = 192.168.0.5
testip = 192.168.0.1
checkonlyidle = yes

[channel1]
device = eth3
ident = iface-3
activeip = 172.0.1.4
passiveip = 172.0.1.5
testip = 172.0.1.100
checkonlyidle = yes

[sendconfig]
activeip = 1.1.1.1
sendtime = 60
device = eth0
config = yes
keys = yes
journals = yes
port = 10090

[misc]
activeconfig = /etc/iplirpsw
passiveconfig = /etc/iplirpsw
maxjournal = 30 #days
reboot = yes

[debug]
debuglevel = 3
debuglogfile = syslog:daemon.debug

[events]
```

```
HW1000Services# failover show config
[network]
checktime = 10
timeout = 2
activeretries = 3
channelretries = 3
synctime = 5
fastdown = yes

[channel1]
device = eth2
ident = iface-2
activeip = 192.168.0.4
passiveip = 192.168.0.6
testip = 192.168.0.1
checkonlyidle = yes

[channel1]
device = eth3
ident = iface-3
activeip = 172.0.1.4
passiveip = 172.0.1.6
testip = 172.0.1.100
checkonlyidle = yes

[sendconfig]
activeip = 1.1.1.2
sendtime = 60
device = eth0
config = yes
keys = yes
journals = yes
port = 10090

[misc]
activeconfig = /etc/iplirpsw
passiveconfig = /etc/iplirpsw
maxjournal = 30 #days
reboot = yes

[debug]
debuglevel = 3
debuglogfile = syslog:daemon.debug

[events]
```

Проверка таблицы mac адресов

На активном сервере:

```

HW1000Services# inet show mac-address-table
Address          HWtype  HWaddress      Flags Mask    Iface
192.168.0.1     ether   7c:69:f6:32:9e:c2  C             eth2
172.0.1.200     ether   00:1e:8c:c0:50:4f  C             eth3
1.1.1.1         (incomplete)
172.0.1.2       (incomplete)
172.0.1.60     ether   00:14:2d:3b:52:20  C             eth3
172.0.1.6       ether   10:bf:48:d7:fd:b3  C             eth3
192.168.0.10    (incomplete)
172.0.1.67     ether   00:50:56:bc:73:c3  C             eth3
192.168.0.200  (incomplete)
192.168.0.2     ether   10:bf:48:4f:60:7b  C             eth2
172.0.1.3       (incomplete)
172.0.1.20     ether   30:85:a9:a5:3c:73  C             eth3
192.168.0.6     ether   10:bf:48:d7:ff:98  C             eth2
172.0.1.100    ether   00:50:56:bc:2e:09  C             eth3
HW1000Services# _

```

На пассивном сервере:

```

HW1000Services> inet show mac-address-table
Address          HWtype  HWaddress      Flags Mask    Iface
192.168.0.4     ether   f4:6d:04:08:f5:39  C             eth2
172.0.1.4       ether   f4:6d:04:08:f4:38  C             eth3
1.1.1.2         ether   68:05:ca:02:0d:10  C             eth0
HW1000Services> _

```


Проверка журнала переключений



Failover view 29.05.2017.13.30.00 30.05.2017.00.00.00

```
HW1000Services# failover view 01.01.2017.00.00.00 01.06.2017.00.00.00
View journal of failover switching
Versions: ViPNet 4.2.1 (2081), daemon 1.5 (1)
Workstation configured for ID 1ACC4E2D (HW1000 Services)
The workstation works in a cluster mode of protection against failures
Workstation time (utc: 1496242930) Wed May 31 18:02:10 2017

23 May 2017 12:36:00    <BOOT> Boot the system
31 May 2017 17:57:07    <BOOT> Boot the system
31 May 2017 18:00:34    <SWITCH> Switch server from passive mode to active mode
31 May 2017 18:01:12    <P_START> Start failover daemon in passive mode
31 May 2017 18:02:01    <A_START> Start failover daemon in active mode
HW1000Services#
```

A sunset scene with a warm orange and yellow sky. In the foreground, the silhouettes of several wind turbines are visible against the bright sky. In the background, a series of high-voltage power lines stretch across the horizon. The overall atmosphere is serene and suggests a focus on renewable energy.

Спасибо!
Вопросы?