

Использование свободного ПО в инфраструктуре облачных услуг

Умеров Амет

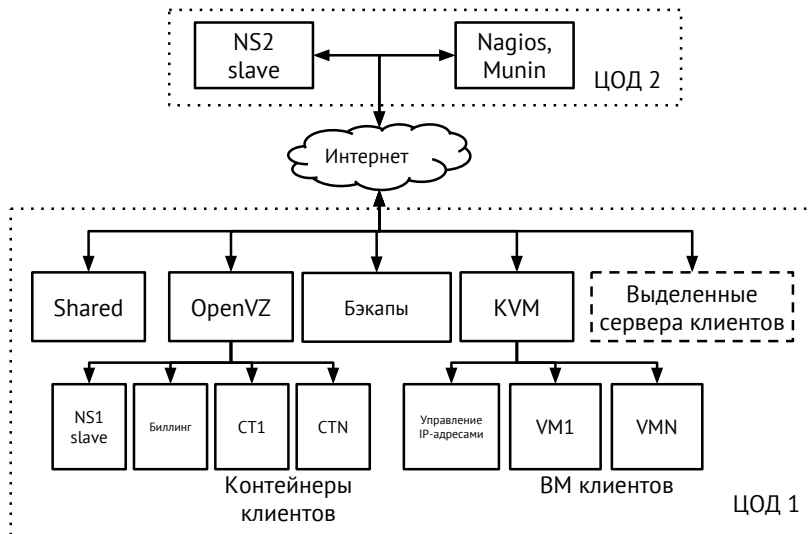
Севастопольский государственный университет

Разработка виртуальной инфраструктуры для реализации облачных услуг

Требования:

- устранение единых точек отказа
- защита от несанкционированного доступа и атак
- **использование свободного ПО**
- документирование инфраструктуры
- автоматизация инфраструктуры
- разработка эффективных тарифных планов хостинга
- использование в бизнесе

Общая схема инфраструктуры



Серверная операционная система

CentOS 7 (GPL)

- 494 из 500 крупнейших суперкомпьютеров работают на Linux
- поддержка 6-10 лет
- свободно распространяемая ОС
- большое количество документации
- имеется опыт работы с дистрибутивом

Мониторинг

Nagios

Nagios®


| Host ** | Service ** | Status ** | Last Check ** | Duration ** |
|--------------------|------------------|-----------|---------------------|---------------|
| node-19.domain.tld | cinder-api | OK | 12-30-2013 20:16:07 | 0d 0h 16m 12s |
| | cinder-scheduler | OK | 12-30-2013 20:16:39 | 0d 0h 15m 40s |
| | cpu | WARNING | 12-30-2013 20:17:10 | 0d 0h 15m 9s |
| | glance-api | OK | 12-30-2013 20:17:42 | 0d 0h 14m 37s |
| | glance-registry | OK | 12-30-2013 20:18:13 | 0d 0h 14m 6s |
| | horizon | OK | 12-30-2013 20:18:45 | 0d 0h 13m 34s |
| | kernel | OK | 12-30-2013 20:19:17 | 0d 0h 13m 2s |
| | keystone | OK | 12-30-2013 20:19:48 | 0d 0h 12m 31s |
| | libs | OK | 12-30-2013 20:20:20 | 0d 0h 11m 59s |
| | load | OK | 12-30-2013 20:20:51 | 0d 0h 11m 28s |
| | memcached | OK | 12-30-2013 20:21:23 | 0d 0h 10m 56s |
| | memory | WARNING | 12-30-2013 20:21:54 | 0d 0h 0m 25s |
| | nova-api | OK | 12-30-2013 20:12:26 | 0d 0h 9m 53s |
| | nova-scheduler | OK | 12-30-2013 20:12:58 | 0d 0h 9m 21s |
| | procs | OK | 12-30-2013 20:14:11 | 0d 0h 8m 50s |
| | swap | OK | 12-30-2013 20:14:01 | 0d 0h 8m 18s |
| | user | OK | 12-30-2013 20:14:32 | 0d 0h 7m 47s |
| | yum | OK | 12-30-2013 20:15:04 | 0d 0h 7m 15s |
| | zombie | OK | 12-30-2013 20:15:36 | 0d 0h 6m 43s |

Мониторинг

Nagios > Icinga2 (GPLv2)

Nagios®

| Host ★★ | Service ★★ | Status ★★ | Last Check ★★ | Duration ★★ |
|--------------------|------------------|-----------|---------------------|---------------|
| node-19.domain.tld | cinder-api | OK | 12-30-2013 20:16:07 | 0d 0h 16m 12s |
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| | libs | OK | 12-30-2013 20:20:20 | 0d 0h 11m 59s |
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| | zombie | OK | 12-30-2013 20:15:36 | 0d 0h 6m 43s |

 **icinga**

Current Incidents Overdue Muted + ▾

Search ...

Dashboard

Problems 19

Overview

History

Reporting

Documentation

System

Configuration

icingaadmin

Logout

Service Problems

CRITICAL
1m 9s
Soft 2/5
test-random-3: service-flapping-1
test-random-3 (checked by vagrant-centos7)
service-flapping-1 unchanged

CRITICAL
1m 33s
Soft 3/5
test-random-2: service-flapping-4
test-random-2 (checked by vagrant-centos7)
service-flapping-4 unchanged

CRITICAL
2m 42s
Soft 4/5
test-random-9: service-flapping-4
test-random-9 (checked by vagrant-centos7)
service-flapping-4 unchanged

UNKNOWN
Sep 24
test-unreachable-1: service-unknown-1
test-unreachable-1 (checked by vagrant-cent
service-unknown-1

UNKNOWN
Sep 24
test-unreachable-10: service-unknown-1
test-unreachable-10 (checked by vagrant-cent
service-unknown-1

UNKNOWN
Sep 24
test-unreachable-2: service-unknown-1
test-unreachable-2 (checked by vagrant-cent
service-unknown-1

UNKNOWN
Sep 24
test-unreachable-3: service-unknown-1
test-unreachable-3 (checked by vagrant-cent
service-unknown-1

UNKNOWN
Sep 24
test-unreachable-4: service-unknown-1
test-unreachable-4 (checked by vagrant-cent
service-unknown-1

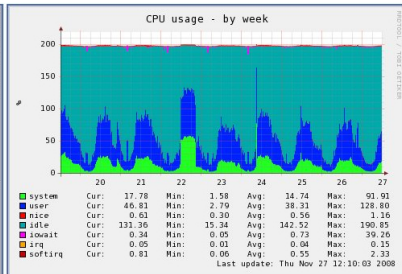
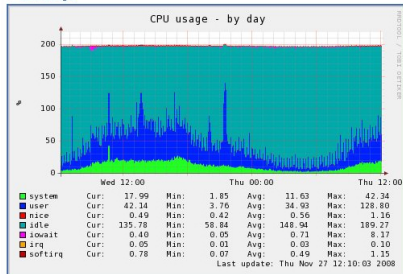
UNKNOWN
Sep 24
test-unreachable-5: service-unknown-1
test-unreachable-5 (checked by vagrant-cent
service-unknown-1

UNKNOWN
Sep 24
test-unreachable-6: service-unknown-1
test-unreachable-6 (checked by vagrant-cent
service-unknown-1

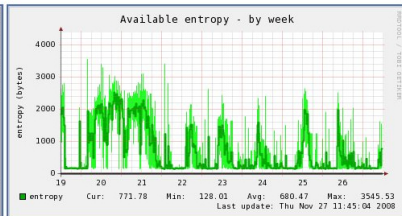
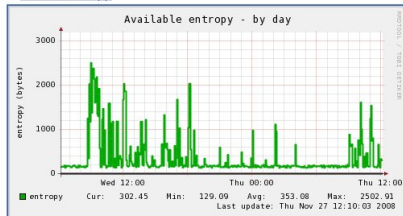
Метрики

Munin (GPL)

:: CPU usage

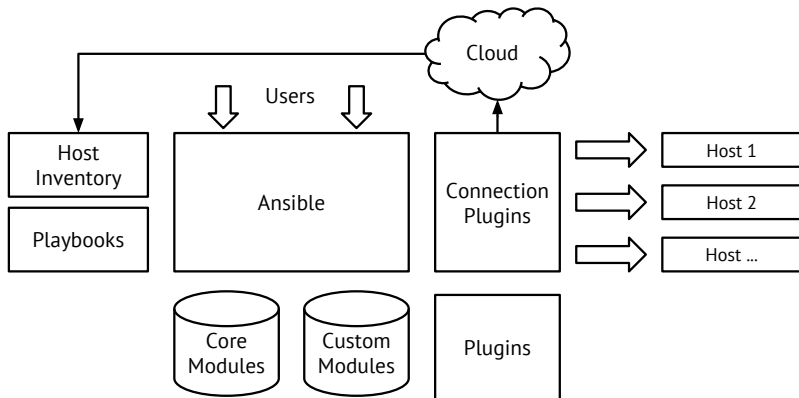


:: Available entropy



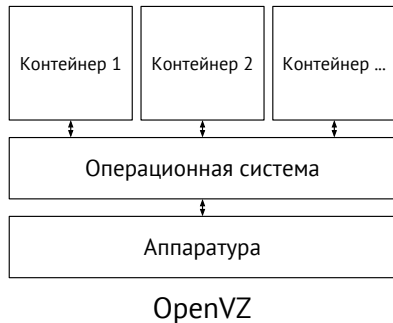
Автоматизация управления

Ansible (GPL) + git (GPLv2)



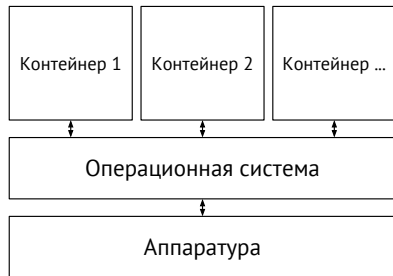
Виртуализация

OpenVZ (GPLv2)

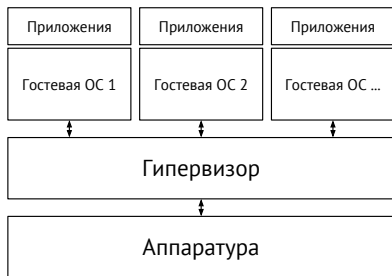


Виртуализация

OpenVZ (GPLv2) + KVM (GPL/LGPL)



OpenVZ



KVM

Стек ПО для shared-хостинга

LAMP+Nginx (GPL/Apache), Exim+Dovecot+SpamAssassin+Roundcube
(GPL/LGPL/MIT)

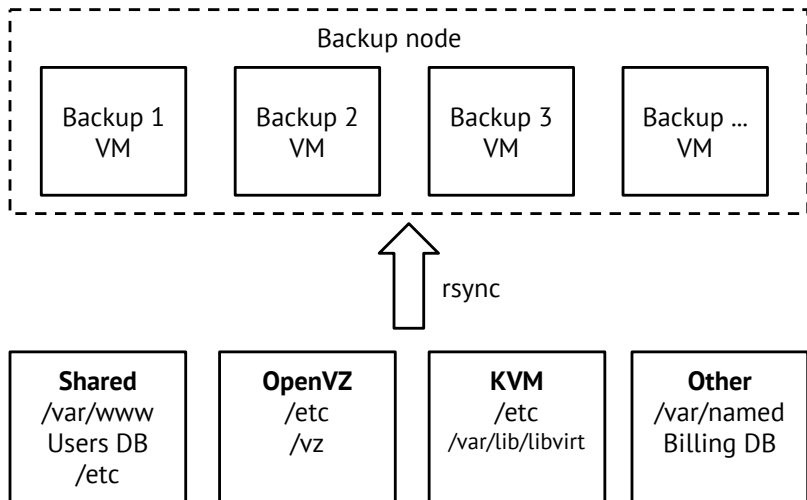


NGINX



Резервное копирование

rsync (GPL)



Вирусы и вредоносы

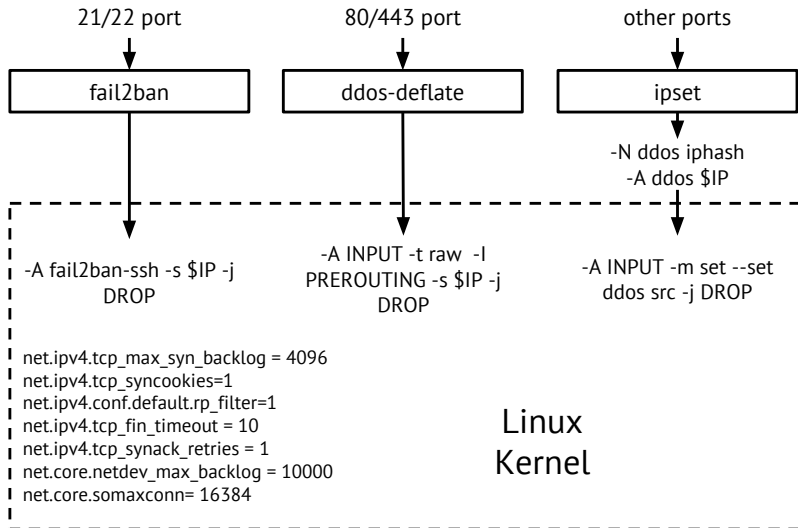
Linux Malware Detect (GPL)

Возможности:

- обнаружение вредоносов по хэш-сумме MD5
- отправка потенциально опасных файлов на сервис rhn.com для внесения в базу сигнатур
- использование exclude-файлов
- удаление инфицированных base64 и gzip вставок
- перемещение зараженных файлов в карантин
- поиск по сигнатурам ClamAV

Защита сети

ddos-deflate (Artistic License) + IPTables/fail2ban/ipset (GPL)



Система отслеживания ошибок (bugtracker)

MantisBT (GPL)



Anonymous | [Login](#) | [Signup for a new account](#)

2016-05-03 11:01 EDT

[My View](#) | [View Issues](#) | [Change Log](#) | [Roadmap](#) | [Wiki](#) | [Repositories](#)

Unassigned (1 - 6 / 2007)

| | |
|--------------------------------|--|
| 0006345 — @ | TIME (HH:MM) Custom Field Patch custom fields - 2016-05-02 11:45 |
| 0020862 — | date and TIME in custom field custom fields - 2016-05-01 14:35 |
| 0020499 — | Compatibility with PHP 7 feature - 2016-05-01 04:39 |
| 0011604 — | Versions marked as obsolete appear on change log page change log - 2016-04-27 08:31 |
| 0017145 ^ | Need to show obsolete versions in Change Log. change log - 2016-04-26 09:01 |
| 0012830 — @ | new HTMLMail plugin v0.1 plug-ins - 2016-04-26 02:07 |


Recently Modified (1 - 6 / 12784)

| | |
|--------------------------------|---|
| 0020866 — | New installation - ISS v/Apache installation - 2016-05-03 03:47 |
| 0020958 — @ | Updating config items in configuration report adds new ones customization - 2016-05-02 22:50 |
| 0006345 — @ | TIME (HH:MM) Custom Field Patch custom fields - 2016-05-02 11:45 |
| 0020867 — | Edit Category Page fails when default user is deleted administration - 2016-05-02 11:25 |
| 0020863 — | APPLICATION ERROR #505 with file upload to DISK attachments - 2016-05-02 07:37 |
| 0020866 — @ | Plugin Filters: Data Type mismatch. filters - 2016-05-02 05:28 |

Панели управления для клиентов

Vesta Control Panel (GPLv3)

[Packages](#) [IP](#) [Graphs](#) [Statistics](#) [Log](#) [Services](#) [Updates](#) [admin](#) [Log out](#)



USER
users: 1
suspended: 0

WEB
domains: 1
aliases: 1
suspended: 0

DNS
domains: 2
records: 22
suspended: 1

MAIL
domains: 2
accounts: 0
suspended: 0

DB
databases: 2
suspended: 0


CRON
jobs: 7
suspended: 0

BACKUP
backups: 0

[Add User](#)

toggle all [apply to selected](#) [>](#)

[Search](#)



admin **black captain**
solo.metal@bigmir.net
[default] package
Bandwidth: 0% (5mb)
Disk: 0% (2mb)
Web: 1mb Databases: 1mb
Mail: 0mb User Directories: 1mb

31 May 2014
active

Web Domains: 1 / 100
SSL Domains: 0
Web Aliases: 100 per domain
DNS domains: 2 / 100
DNS records: 100 per domain
Name Servers: ns1.fozzy.com
ns2.fozzy.com

logout

edit

suspend

delete

Mail Domains: 2 / 100
Mail Accounts: 100 per domain
Databases: 2 / 100
Cron Jobs: 7 / 100
SSH Access: bash
IP Addresses: 1
Backups: 0 / 3

1 account

Сравнение с закрытыми аналогами

| Open Source | Closed Source |
|----------------------|---|
| CentOS 7 Debian 8 | RHEL 7 – \$900/год за 1 сервер SLES 12 – \$700/год за 1 сервер |
| Nagios Munin | Sensu – \$600/год за 50 серверов Opsview – \$935/год за 50 серверов |
| OpenVZ KVM | Virtuozzo – \$6200/год за 100 контейнеров vCenter Server – \$1750/год за 1 CPU |
| Maldet MantisBT | Virusdie – \$20/год + \$2/год за сайт Jira – \$1800 за 25 пользователей |

Стоимость лицензий и обслуживания

- RHEL 7 (10 серверов) – \$9000/год
- Virtuozzo (100 контейнеров x 10 серверов) – \$62000/год
- vSphere Server (4 CPU x 10 серверов) – \$70000/год
- Sensu/Opview (30-50 серверов) – \$600-935/год
- Jira (25 чел.) – \$1800/год
- Virusdie (2000 сайтов x 10 серверов) – \$40000/год

Итого: **\$264 400/год**

Проекты в Open Source

- openvz-tutorial (CC BY-SA 4.0):
github.com/Amet13/openvz-tutorial
- virtuoizzo-tutorial (CC BY-SA 4.0):
github.com/Amet13/virtuoizzo-tutorial
- ddos-defalte (Artistic License 2.0):
github.com/Amet13/ddos-deflate
- ansible-vz-wordpress (GNU GPLv3):
github.com/Amet13/ansible-vz-wordpress
- icinga2-plugins-extra (GNU GPLv3):
github.com/Amet13/icinga2-plugins-extra
- bachelor-diploma (CC BY-SA 4.0):
github.com/Amet13/bachelor-diploma

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