



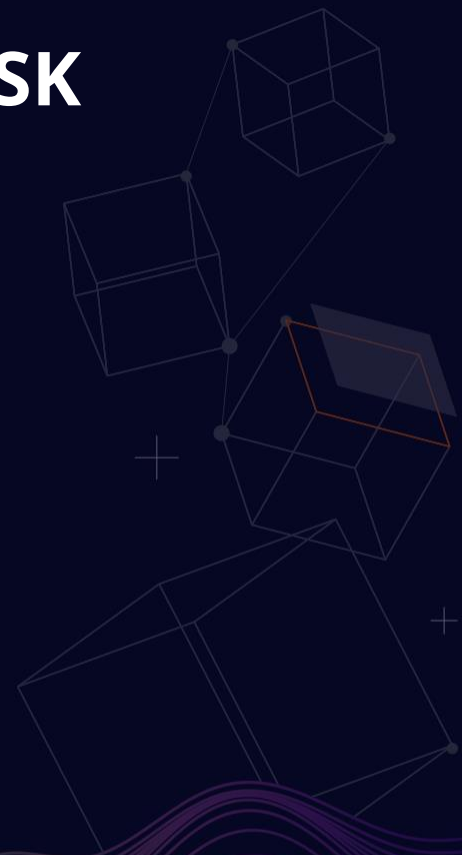
ASTERISK IN DOCKER CONTAINERS



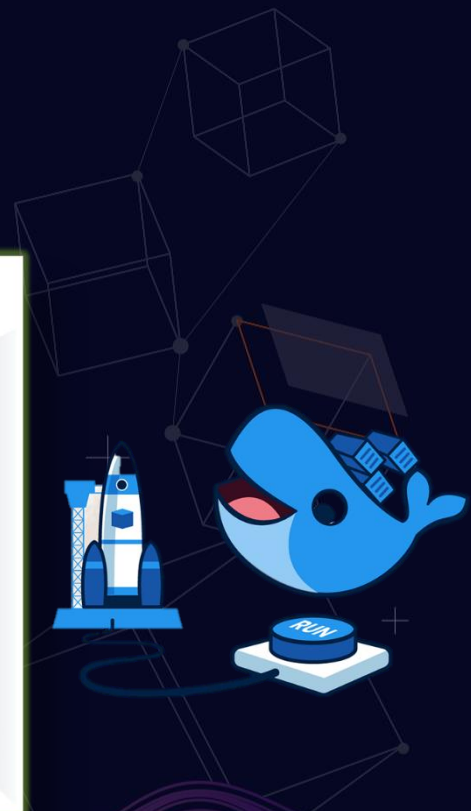
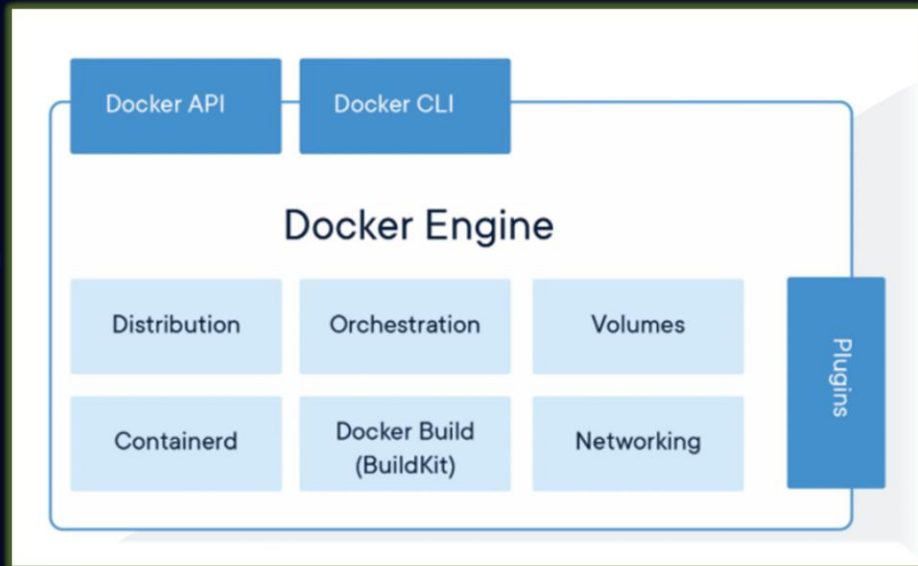
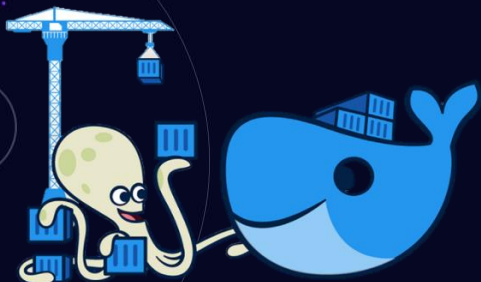
ПРОБЛЕМЫ STANDALONE ASTERISK



- Использование выделенной машины для ASTERISK
- Разрозненная конфигурация, скрипты и дополнительные модули
- Сложность переноса, резервного копирования и восстановления
- Проблемы при дублировании конфигурации
- Проблема поддержки актуальной версии и обновления модулей



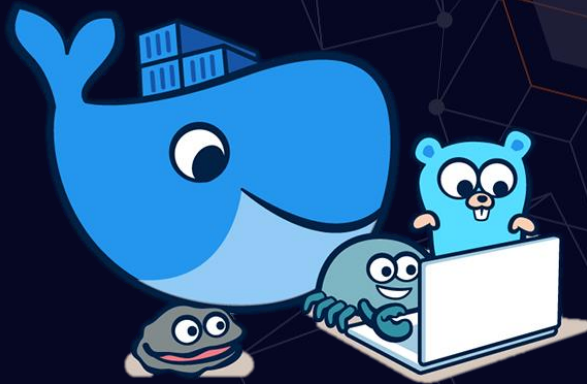
WHAT'S DOCKER.IO



ПРЕИМУЩЕСТВА DOCKER



- Создание своей сборки Asterisk с нужными модулями и базовой конфигурацией
- Независимость от аппаратной платформы и базовой ОС
- Хранение всех настроек и данных АТС в одной папке
- Быстрое развёртывание, клонирование, резервное копирование и восстановление



Подготовка образа

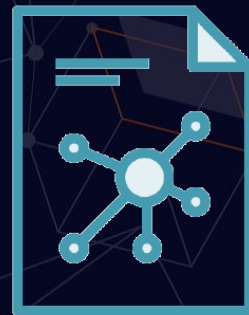
1. Разработка Dockerfile
2. Сборка
3. Публикация



Dockerfile



build



image

Dockerfile



- FROM – базовый образ на основе которого собирается Ваш образ
- ADD – добавление файлов в образ
- RUN – выполнение команды в собираемом образе
- COPY – копирование из сборочного образа в результирующий образ
- SHELL – интерпретатор по умолчанию
- CMD – исполняемый скрипт образа

```
# Dockerfile
# build stage
FROM buildbase as build
...
...
...

# production ready stage
FROM runbase
...
COPY --from=build
/artifact /app
```

Базовый образ и сборка Asterisk

```
Dockerfile > ...
1 FROM centos:7 as build
2 ENV container docker
3 LABEL maintainer="Ruslan Polukhin <rp@erpico.ru>"
4
5 RUN yum update -y && \
6     yum install -y git httpd openssl libcurl-devel libcurl wget ncurses-devel ncurses-libs ncurses java mc telnet net-tools psmisc yum-utils epel-release crontabs && \
7     yum groupinstall -y "Development tools" && \
8     yum install -y https://dev.mysql.com/get/mysql80-community-release-el7-3.noarch.rpm && \
9     yum install -y mysql-community-libs mysql-connector-c++-devel mysql-devel mysql && \
10    yum install -y https://rpms.remirepo.net/enterprise/remi-release-7.rpm && \
11    yum-config-manager --enable remi-php74 && \
12    yum install -y php php-json php-mysql php-mbstring php-xml php-gd composer && \
13    mkdir -p /usr/local/erpico && mkdir -p /usr/local/erpico/bin
14
15 # Asterisk
16 WORKDIR /tmp
17 ADD ./menuselect.makeopts /tmp/menuselect.makeopts
18 RUN --mount-type=secret,id=gitlab,required \
19     git clone https://docker:${cat /run/secrets/gitlab | grep '^jds_asterisk:' | sed -e "s/^jds_asterisk:/"})@git.erpico.ru/erpicopbx/asterisk.git && \
20     cd asterisk && \
21     git checkout erpico-1.8 && \
22     ./contrib/scripts/install_prereq install && \
23     ./configure && \
24     cp ../menuselect.makeopts ./ && \
25     rm -f ../menuselect.makeopts && \
26     ./contrib/scripts/get_mp3_source.sh && \
27     make -s && make install && \
28     cd .. && \
29     rm -rf ./asterisk
30
```



Сборка дополнительных модулей

```
Dockerfile > ...
30
31 # Epbx
32 WORKDIR /tmp
33 RUN --mount=type=secret,id=gitlab,required \
34     git clone https://docker:$(cat /run/secrets/gitlab | grep '^jds_epbx:' | sed -e "s/^jds_epbx://")@git.erpico.ru/erpicopbx/epbx-s
35     cd epbx-server && \
36     make && \
37     cp ./build/x86_64/Release/2.6-cc2/epbx-server /usr/local/erpico/bin &&\
38     cd .. &&\
39     rm -rf ./epbx-server
40
41 #OC_daemon
42 WORKDIR /tmp
43 RUN --mount=type=secret,id=gitlab,required \
44     git clone https://docker:$(cat /run/secrets/gitlab | grep '^jds_oc:' | sed -e "s/^jds_oc://")@git.erpico.ru/erpicopbx/oc_daemon.
45     cd oc_daemon && \
46     make && \
47     cp ./x86_64/Release/2.6-cc2/oc_daemon /usr/local/erpico/bin &&\
48     cd .. &&\
49     rm -rf ./oc_daemon
50
```


Подготовка финального образа

Dockerfile > ...

```
47
48 FROM centos:7
49 ENV container docker
50 LABEL maintainer="Ruslan Polukhin <rp@erpico.ru>"
51
52 RUN yum update -y && \
53     yum install -y git httpd openssl libcurl wget ncurses-libs ncurses java mc telnet net-tools psmisc yum-utils epel-release crontabs && \
54     yum install -y https://dev.mysql.com/get/mysql80-community-release-el7-3.noarch.rpm && \
55     yum install -y mysql-community-libs mysql && \
56     yum install -y https://rpms.remirepo.net/enterprise/remi-release-7.rpm && \
57     yum-config-manager --enable remi-php74 && \
58     yum install -y php php-json php-mysql php-mbstring php-xml php-gd composer
59
60 #Copy Asterisk
61 COPY --from=build /usr/sbin/asterisk /usr/sbin/asterisk
62 COPY --from=build /usr/sbin/safe_asterisk /usr/sbin/safe_asterisk
63 COPY --from=build /usr/sbin/rasterisk /usr/sbin/rasterisk
64 COPY --from=build /usr/lib/asterisk /usr/lib/asterisk
65
66 #Copy Erpico modules
67 COPY --from=build /usr/local/erpico /usr/local/erpico
68
69 ADD ./etc/selinux/config /etc/selinux/config
70 ADD ./etc/jboss-as/* /etc/jboss-as/
71 ADD ./etc/php.ini /etc/php.ini
72 ADD ./etc/httpd/conf/httpd.conf /etc/httpd/conf/httpd.conf
73
```



Установка Sox, Jboss, Webif

```
Dockerfile > ...
76 # SOX
77 RUN yum install -y gcc-c++ libmad libmad-devel libid3tag libid3tag-devel lame lame-devel flac-devel libvorbis-devel && \
78 wget https://altushost-swe.dl.sourceforge.net/project/sox/sox/14.4.2/sox-14.4.2.tar.gz && \
79 tar xvfz sox-14.4.2.tar.gz && \
80 cd sox-14.4.2 && \
81 ./configure && \
82 make -s && \
83 make install && \
84 cd .. && \
85 rm -rf sox-14.4.2
86
87 # JBOSSE
88 WORKDIR /usr/local/erpico
89 RUN --mount=type=secret,id=gitlab,required \
90 git clone https://docker:${(cat /run/secrets/gitlab | grep '^jds_jboss:' | sed -e 's/^jds_jboss:/' )}@git.erpico.ru/erpico/jboss.git && \
91 rm -f ./standalone/deployments/crm-server*
92
93 # WEB
94 WORKDIR /var/www
95 RUN rm -rf ./html && \
96 git clone https://github.com/erpico/pbx.git html && \
97 cd html && \
98 git checkout beta && \
99 chmod a+w logs && \
100 composer install && \
101 mkdir -p configs && \
102 sed -e 's/public function withJson($data, $status = null, $encodingOptions = 0)/public function withJson($data, $status = null, $encodingOptions = JSON_UNESCAPED_UNICODE)/g' -i ./v
103
104 #openvpn and splash
105 RUN yum install -y openvpn figlet jq
106 ADD ./etc/openvpn/* /etc/openvpn/
107 ADD ./etc/profile.d/* /etc/profile.d/
108
```



Supervisor, sngrep, crontab, fail2ban

```
Dockerfile > ...
109 # Setup supervisor
110 RUN yum install -y supervisor && \
111     mkdir -p /var/log/supervisor && \
112     mkdir -p /etc/supervisor/conf.d
113 ADD ./etc/supervisor.conf /etc/supervisord.conf
114
115 ADD ./usr/local/erpico/bin/* /usr/local/erpico/bin
116 RUN chmod a+x /usr/local/erpico/bin/*
117
118 # sngrep
119 ADD ./etc/yum.repos.d/irontec.repo /etc/yum.repos.d/irontec.repo
120 RUN rpm --import http://packages.irontec.com/public.key && \
121     yum install -y sngrep
122
123 # Setup crontab
124 ADD ./crontab /tmp/crontab
125 RUN crontab -u root /tmp/crontab && \
126     rm -f /tmp/crontab
127
128 # Fail2ban
129 RUN yum install -y fail2ban
130 COPY ./etc/fail2ban/ /etc/fail2ban
131
132 SHELL [ "/bin/bash " ]
133 CMD ["/usr/local/erpico/bin/init"]
134
```





Supervisor: A Process Control System

- Контроль работы сервисов:
 - Запуск
 - Перезапуск
 - Остановка
- Управление:
 - XML-RPC
 - Веб-интерфейс
- Настройка:
 - Конфигурационные файлы



Конфигурация supervisor

```
etc >  supervisor.conf
1  [supervisord]
2  nodaemon=false
3  user=root
4  http_port=/var/tmp/supervisor.sock
5
6  [supervisorctl]
7  serverurl=unix:///var/tmp/supervisor.sock
8
9  [inet_http_server]
10 port = *:9001
11 username = erpicopbx
12 password = k9JjUk4FImZJSrc
13
14 [unix_http_server]
15 file=/var/tmp/supervisor.sock
16
17 [rpcinterface:supervisor]
18 supervisor.rpcinterface_factory = supervisor.rpcinterface:make_main_rpcinterface
19
20 [program:httpd]
21 command=/usr/sbin/apachectl -DFOREGROUND
22 killasgroup=true
23 stopasgroup=true
24 redirect_stderr=true
25 autorestart=true
26
```

```
etc >  supervisor.conf
26
27 [program:asterisk]
28 command=/usr/sbin/asterisk -f
29 killasgroup=true
30 stopasgroup=true
31 redirect_stderr=true
32 autostart=false
33 autorestart=true
34
35 [program:jboss]
36 command=/usr/local/erpico/jboss/bin/standalone.sh
37 killasgroup=true
38 stopasgroup=true
39 redirect_stderr=true
40 autostart=false
41 autorestart=true
42
43 [program:epbx]
44 command=/usr/local/erpico/bin/epbx-server
45 killasgroup=true
46 stopasgroup=true
47 redirect_stderr=true
```



Стартовый скрипт

```
usr > local > erpico > bin > $_ init
1  #!/bin/sh
2
3  echo
4  figlet -c ErpicoPBX
5  echo
6  figlet -f term -c "+7 (4852) 593-100"
7  figlet -f term -c support@erpico.ru
8  echo
9
10 mkdir -p /run/httpd
11 mkdir -p /var/log/erpico
12 mkdir -p /var/log/httpd
13 mkdir -p /var/run/fail2ban
14
15 /usr/bin/supervisord -c /etc/supervisord.conf
16
17 function handle_signal {
18 | echo "Signal received $2"
19 | }
20
21 trap "handle_signal" SIGINT
22
23 # Cleanup
24 rm -f /etc/asterisk/ams.conf
25 rm -f /etc/asterisk/loc_conf/musl.conf
```

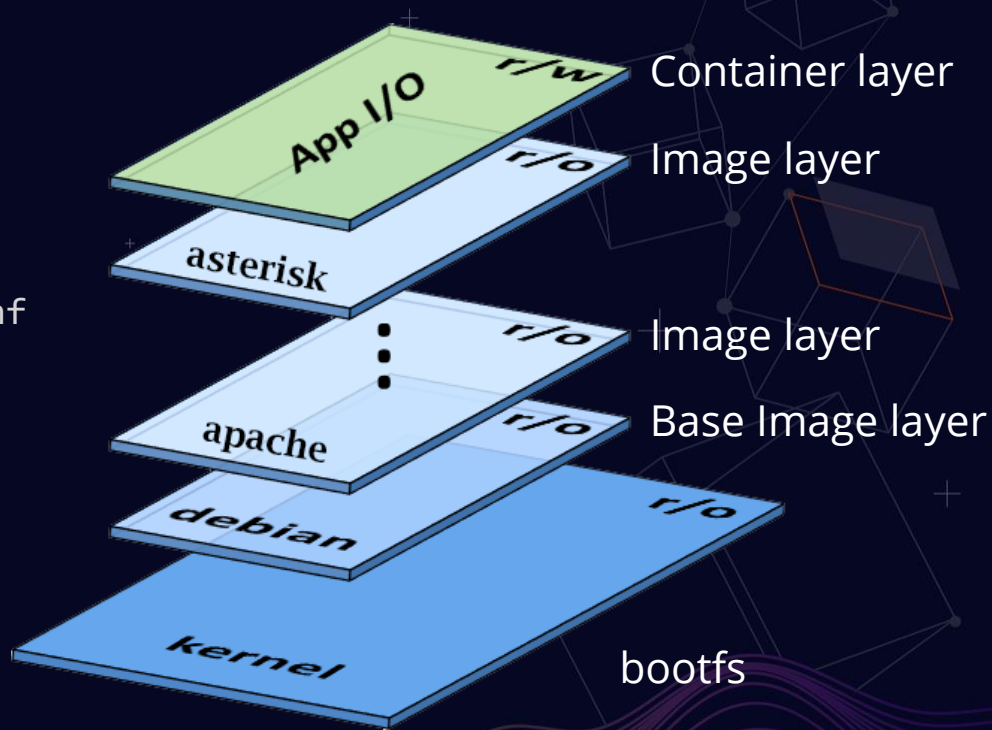
```
usr > local > erpico > bin > $_ init
110
111 /var/www/html/genconfigs.sh noreload
112
113 if [ -z "$ASTERISK_DISABLE" ]; then
114 supervisorctl start asterisk
115 supervisorctl start fail2ban
116 fi
117
118 supervisorctl start jboss
119 supervisorctl start epbx
120 supervisorctl start cron
121 supervisorctl start oc
122
123 if [ -z "$OPENVPN_DISABLE" ]; then
124 supervisorctl start openvpn
125 fi
126
127 [ ! -d "/.git" ] && /usr/local/erpico/bin/git_install.sh
128
129 echo "ErpicoPBX started"
130
131 while ;; do
132 | sleep 1
133 done
```



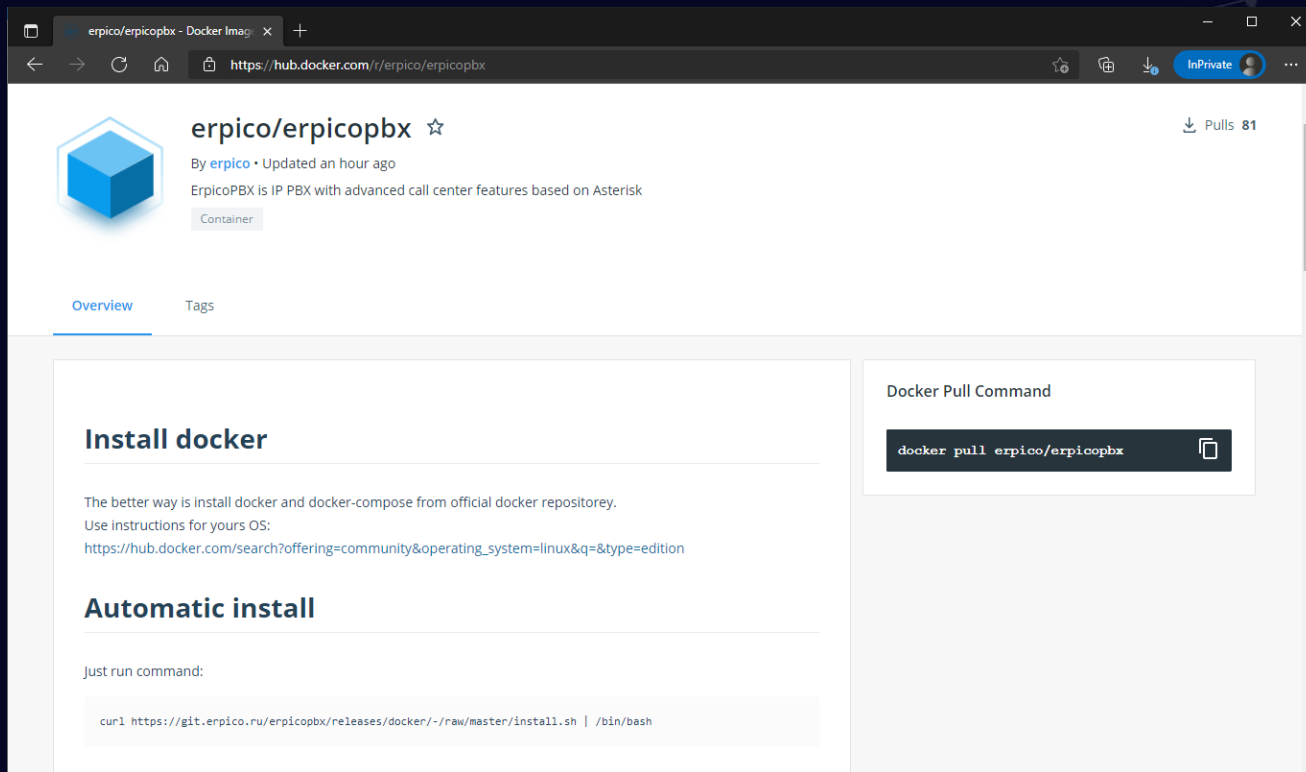
BUILD & PUBLISH



- `docker-compose down`
- `docker build`
 - `--rm`
 - `-t erpico/erpicopbx`
 - `--secret id=gitlab,src=secrets.conf`
 - `-f Dockerfile .`
- `docker push erpico/erpicopbx`
- `docker builder prune`



Размещение образа в dockerhub



The screenshot shows a web browser window displaying the Docker Hub page for the image `erpico/ericopbx`. The page includes the following elements:

- Header:** The image name `erpico/ericopbx` with a star icon and a pull count of 81.
- Author:** By `erpico`, updated an hour ago.
- Description:** ErpicoPBX is IP PBX with advanced call center features based on Asterisk.
- Category:** Container.
- Navigation:** Overview (selected) and Tags.
- Install docker:** A section with the heading "Install docker" and instructions on how to install Docker and Docker Compose from the official repository.
- Automatic install:** A section with the heading "Automatic install" and a command to run: `curl https://git.erpico.ru/ericopbx/releases/docker/-/raw/master/install.sh | /bin/bash`.
- Docker Pull Command:** A box containing the command `docker pull erpico/ericopbx` with a copy icon.

Deploy: docker-compose

- Используемый образ
- Название контейнера
- Правила запуска
- Привилегированный режим
- Отображение папок на локальную файловую систему
- Параметры окружения
- Режим работы сети

```
docker-compose.yml
1  version: '3.3'
2  services:
3    erpicopbx:
4      image: erpico/erpicopbx:latest
5      hostname: erpicopbx
6      container_name: erpicopbx
7      restart: always
8      privileged: true
9      volumes:
10     - /etc/localtime:/etc/localtime:ro           # Sync timezone
11     - /etc/erpico.conf:/etc/erpico.conf:rw       # Main configuration file
12     - /opt/erpicopbx/conf:/etc/asterisk:rw      # Asterisk configuration files
13     - /opt/erpicopbx/records:/var/spool/asterisk/monitor:rw # Call recordings
14     - /opt/erpicopbx/sounds:/var/lib/asterisk/sounds:rw # Sound files
15     - /opt/erpicopbx/mohs:/var/lib/asterisk/moh:rw # Music on hold classes
16     - /opt/erpicopbx/agi-bin:/var/lib/asterisk/agi-bin:rw # Processing AGI scripts
17     - /opt/erpicopbx/logs:/var/log:rw          # Log files
18     - /opt/erpicopbx/backup:/.backup:rw        # Folder for backups
19     environment:
20       - TIME_ZONE=Europe/Moscow
21       - OPENVPN_DISABLE=1
22       - ASTERISK_DISABLE=1                      # Specify for disable internal asterisk instance
23     # network_mode: "host" # Use host network
24     # Comment line above and uncomment below to use custom network configuration
25     ports:
26       - 85:80
27       - 8080:8080
28     #   - 5039:5039
29     #   - 5060:5060
30     #   - 5060:5060/udp
31     #   - 10000-10500:10000-10500/udp
32     networks:
33       - erpicopbx-net
34
35 networks:
36   erpicopbx-net:
37
```



Установка и запуск

- Устанавливаем docker-compose с официального сайта
- Выполняем скрипт `curl https://git.erpico.ru/erpicopbx/releases/docker/-/raw/master/install.sh | /bin/bash`
- Запуск: `docker-compose up -d`
- Управление: `docker exec -it erpicopbx bash`

```
[root@cloud docker]# docker-compose up -d
Creating erpicopbx ... done
[root@cloud docker]# docker exec -it erpicopbx bash
```



```
+7 (4852) 593-100
support@erpico.ru
```

Hostname:	erpicopbx
Date:	Thu Sep 16 15:39:58 MSK 2021
Uptime:	146 days
Load average:	0.79,

Network interfaces:	
docker0:	172.17.0.1
ens33:	
ens160:	192.168.140.159

Disk space:	
/	%

Services:	
supervisord	OK
httpd	OK
asterisk	OK
fail2ban	OK
jboss	OK
epbx-server	OK
oc	OK
crond	OK
openvpn	NOT OK

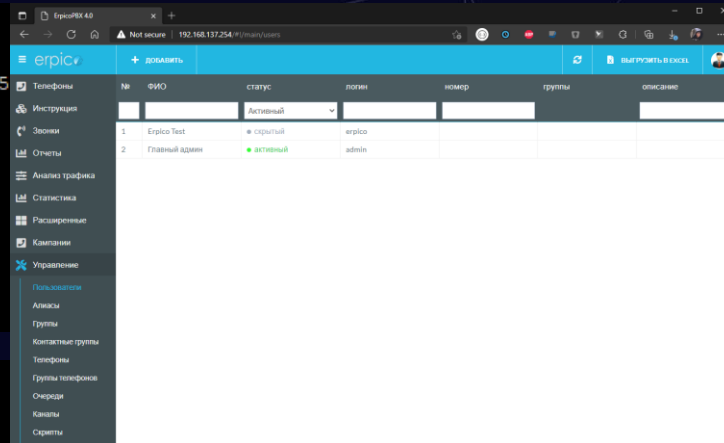
```
[root@erpicopbx www]#
```


Время развёртывания – 2 минуты

```
9a2ee30b1112: Pull complete
095c0c1c6994: Pull complete
ca4b3302ff6d: Pull complete
Digest: sha256:32ab5458d90f1c154655082cae96c630c43ecae001be3ae9a88e422365e5
Status: Downloaded newer image for erpicopbx:latest
Creating mysql ...
Creating mysql ... done
Creating erpicopbx ...
Creating erpicopbx ... done

real    2m51.369s
user    0m1.213s
sys     0m0.261s
```

```
[root@erpicopbx www]# asterisk -r
Asterisk GIT-1.8-6ea8e97, Copyright (C) 1999 - 2013 Digium, Inc. and others.
Created by Mark Spencer <markster@digium.com>
Asterisk comes with ABSOLUTELY NO WARRANTY; type 'core show warranty' for details.
This is free software, with components licensed under the GNU General Public
License version 2 and other licenses; you are welcome to redistribute it under
certain conditions. Type 'core show license' for details.
=====
Connected to Asterisk GIT-1.8-6ea8e97 currently running on erpicopbx (pid = 103)
erpicopbx*CLI> sip show peers
Name/username      Host                      Dyn Forcerport ACL Port      Status
demo/rp_demo       192.168.137.8             N          5066    OK (1 ms)
test               (Unspecified)            D          N       0        Unmonitored
2 sip peers [Monitored: 1 online, 0 offline Unmonitored: 0 online, 1 offline]
erpicopbx*CLI> exit
```



The screenshot shows the web interface of erpicopbx. The main content area displays a table with the following data:

№	ФИО	статус	логин	номер	группы	описание
1	Erpico Test	активный	erpico			
2	Главный админ	активный	admin			

The interface includes a sidebar with navigation options: Телефоны, Инструция, Звонки, Отчеты, Анализ трафика, Статистика, Расширенные, Кампании, and Управление. Under 'Управление', there are sub-links for Пользователи, Алиасы, Группы, Контакты: группы, Телефоны, Группы телефонов, Очереди, Каналы, and Секреты.



Кастомизация образа

- Новый Dockerfile на основе базового образа
- Добавление нужных модулей или изменение конфигурации
- Сборка
- Публикация
- Развертывание

Dockerfile X

C: > Projects > ErpicoPBX > docker.dongle > Dockerfile > ...

```
1 FROM erpico/erpicopbx:latest as build
2 ENV container docker
3 LABEL maintainer="Ruslan Polukhin <rp@erpico.ru>"
4
5 RUN git clone https://github.com/bg111/asterisk-chan-dongle.git && \
6     autoconf && \
7     ./configure &&\
8     make && make install
9
10 SHELL [ "/bin/bash " ]
11 CMD [ "/usr/local/erpico/bin/init" ]
12
```



Обновление

- Остановка ATC
`docker-compose down`
- Обновление образа
`docker pull erpico/erpicopbx`
- Запуск ATC
`docker-compose up -d`

```
root@urunner:/opt# docker-compose down
Stopping erpicopbx ... done
Stopping mysql ... done
Removing erpicopbx ... done
Removing mysql ... done
root@urunner:/opt# docker pull erpico/erpicopbx
Using default tag: latest
latest: Pulling from erpico/erpicopbx
Digest: sha256:32ab5458d90f1c154655082cae96c630c43ecae001k
Status: Image is up to date for erpico/erpicopbx:latest
docker.io/erpico/erpicopbx:latest
root@urunner:/opt# docker-compose up -d
Creating mysql ...
Creating mysql ... done
Creating erpicopbx ...
Creating erpicopbx ... done
```


Спасибо за внимание!

Образ для загрузки сборки доступен в **dockerhub**:
<https://hub.docker.com/r/erpico/erpicopbx>

welcome@erpico.ru
Telegram: @erpico
erpico.ru

