freeswitch的安装和配置

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目录

1. 安装 `freeswitch`

1.1 相关地址

- FreeSWITCH 中文站 (https://link.jianshu.com?t=http://www.freeswitch.org.cn/)
- FreeSWITCH 相关 (https://link.jianshu.com?t=http://www.freeswitch.org.cn/tags.html)
- FreeSWITCH 初步 (https://link.jianshu.com?t=http://www.dujinfang.com/2010/04/14/freeswitch-chu-bu.html)
- `sipjs` (https://link.jianshu.com?t=http://sipjs.com/guides/server-configuration/freeswitch/)
- 新版本 (https://link.jianshu.com?t=http://www.8000hz.com/archives/freeswitch-git-compile-1-7.html)
- `h264` (https://link.jianshu.com?t=http://www.8000hz.com/archives/freeswitch-1-7-openh264-mcu.html)

1.2 安装基础包

```
$ sudo yum install epel-release vim -y
$ curl -O  http://files.freeswitch.org/freeswitch-releases/freeswitch-1.6.6.tar.bz2
$ sudo yum install bzip2 -y
$ tar xvjf freeswitch-1.6.6.tar.bz2
```

1.3 安装依赖包

```
vel libcurl-devel pcre-devel  speex-devel ldns-devel  libedit-devel  openssl-devel -y
ndfile-devel libyuv-devel git libtool -y
```

1.4 代码依赖包

```
$ cd freeswitch-1.6.6
$ cd libs/
$ git clone https://freeswitch.org/stash/scm/sd/libyuv.git
$ cd libyuv/
$ make -f linux.mk CXXFLAGS="-fPIC -O2 -fomit-frame-pointer -Iinclude/"
$ sudo make install
$ sudo cp /usr/lib/pkgconfig/libyuv.pc /usr/lib64/pkgconfig/
$ cd ..
$ git clone https://freeswitch.org/stash/scm/sd/libvpx.git
$ cd libvpx/
$ sudo yum install yasm -y
$ ./configure --enable-pic --disable-static --enable-shared
$ make
$ sudo make install
$ sudo cp /usr/local/lib/pkgconfig/vpx.pc /usr/lib64/pkgconfig/
$ cd ..
$ git clone https://freeswitch.org/stash/scm/sd/opus.git
$ cd opus/
$ ./autogen.sh
$ ./configure
$ make
$ sudo make install
$ sudo cp /usr/local/lib/pkgconfig/opus.pc /usr/lib64/pkgconfig
$ cd ..
$ git clone https://freeswitch.org/stash/scm/sd/libpng.git
$ cd libpng/
$ ./configure
$ make
$ sudo make install
$ sudo cp /usr/local/lib/pkgconfig/libpng* /usr/lib64/pkgconfig/
```

1.5 编译

```
$ cd freeswitch-1.6.6
$ ./configure
$ make
$ sudo make install
```

1.6 安装声音文件

```
$ sudo make cd-sounds-install
$ sudo make cd-moh-install
```

1.7 新版本安装 *上面的安装依赖包不用git到工程文件夹*

```
$ git clone https://freeswitch.org/stash/scm/fs/freeswitch.git
$ cd freeswitch
$ sh support-d/prereq.sh
$ sh bootstrap.sh
$ ./configure --prefix=/usr/local/freeswitch
$ make
$ sudo make install
```

1.8 设置链接符号,便于使用

```
$ sudo ln -sf /usr/local/freeswitch/bin/freeswitch /usr/local/bin/
$ sudo ln -sf /usr/local/freeswitch/bin/fs_cli /usr/local/bin/
```

1.9 部署成服务

sudo vim /usr/lib/systemd/system/freeswitch.service

```
[Unit]
Description=freeswitch
After=syslog.target
After=network.target

[Service]
Type=simple
User=root
Group=root
WorkingDirectory=/home/mintcode
ExecStart=/usr/local/freeswitch/bin/freeswitch
ExecStop=/usr/local/freeswitch/bin/freeswitch -stop
Restart=always

[Install]
WantedBy=multi-user.target
```

1.10 配置文件

- conf\sip_profiles\internal.xml 配置sip信息

1.10.1 添加 H263 ~ H264 *1.7版本*

1. $ sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/modules.conf.xml

   的 `<load module="mod_h26x"/>` 去掉注释

2. $ sudo vim /usr/local/freeswitch/etc/freeswitch/vars.xml

```
<X-PRE-PROCESS cmd="set" data="global_codec_prefs=OPUS,G722,PCMU,PCMA,VP8,VP9,H263,
<X-PRE-PROCESS cmd="set" data="outbound_codec_prefs=OPUS,G722,PCMU,PCMA,VP8,VP9,H26
```

1.10.2 添加授权注册 需要编译 `mod_xml_curl` (https://link.jianshu.com? t=https://freeswitch.org/confluence/display/FREESWITCH/mod_xml_curl)

1. `$ sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/modules.conf.xml`

   的 `<load module="mod_xml_curl"/>` 去掉注释

2. `$ sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/xml_curl.conf.xml`

```
    <binding name="directory">
      <param name="gateway-url" value="http://192.168.1.173:20501/freeswitch/dicector
    </binding>
```

3. `MSB` 配置

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<routes xmlns="http://camel.apache.org/schema/spring">
  <route>
    <from uri="netty4-http:http://{{msb.hostName}}:20501/freeswitch/dicectory"
    />
    <setHeader headerName="dial-string">
      <constant>
        {presence_id=${dialed_user}@${dialed_domain}}${sofia_contact(${dialed_user}@$
      </constant>
    </setHeader>
    <setHeader headerName="user">
      <javaScript>
        decodeURIComponent(request.headers.get('user'))
      </javaScript>
    </setHeader>
    <transform>
      <simple>
        <![CDATA[ <document type="freeswitch/xml">
        <section name="${header.section}">
        <domain name="${header.domain}">
        <params>
        <param name="dial-string" value="${header.dial-string}"/></params>
        <groups>
          <group name="default">
            <users>
              <user id="${header.user}">
                <params><param name="password" value="1234"/></params>
              </user>
            </users>
          </group>
        </groups>
        </domain></section></document>
        ]]>
      </simple>
    </transform>
    <removeHeaders pattern="*" />
    <setHeader headerName="Content-Type">
      <simple>
        text/xml
      </simple>
    </setHeader>
  </route>
</routes>
```

1.11 相关命令

1. 显示哪些用户已注册 `sofia status profile internal reg`
2. 控制台显示 `info` 级别日志 `fs_cli -l info`
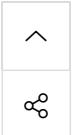
2. 错误解决

2.1 `freeswitch.service start request repeated too quickly, refusing to start`

```
#去掉下面的配置项
WorkingDirectory=/home/mintcode
```

2.2 `fs_cli` 连接不上

`sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/event_socket.conf.xml`

```
<configuration name="event_socket.conf" description="Socket Client">
  <settings>
    <!-- Allow socket connections from any host -->
    <param name="listen-ip" value="127.0.0.1"/>
    <param name="listen-port" value="8021"/>
    <param name="password" value="ClueCon"/>
  </settings>
</configuration>
```

2.3 `2016-03-08 14:29:50.925294 [ERR] mod_xml_curl.c:459 Binding has no url!`

sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/xml_curl.conf.xml

```
<configuration name="xml_curl.conf" description="cURL XML Gateway">
  <bindings>
    <binding name="example">
      <!-- Allow to bind on a particular IP for requests sent -->
      <!--<param name="bind-local" value="$${local_ip_v4}" />-->
      <!-- The url to a gateway cgi that can generate xml similar to
           what's in this file only on-the-fly (leave it commented if you dont
           need it) -->
      <!-- one or more |-delim of configuration|directory|dialplan -->
      <!-- <param name="gateway-url" value="http://www.freeswitch.org/gateway.xml" bi
      <!-- set this to provide authentication credentials to the server -->
      <!--<param name="gateway-credentials" value="muser:mypass"/>-->
      <!--<param name="auth-scheme" value="basic"/>-->

      <!-- optional: this will enable the CA root certificate check by libcurl to
           verify that the certificate was issued by a major Certificate Authority.
           note: default value is disabled. only enable if you want this! -->
      <!--<param name="enable-cacert-check" value="true"/>-->
      <!-- optional: verify that the server is actually the one listed in the cert --
      <!-- <param name="enable-ssl-verifyhost" value="true"/> -->

      <!-- optional: these options can be used to specify custom SSL certificates
           to use for HTTPS communications. Either use both options or neither.
           Specify your public key with 'ssl-cert-path' and the private key with
           'ssl-key-path'. If your private key has a password, specify it with
           'ssl-key-password'. -->
      <!-- <param name="ssl-cert-path" value="$${certs_dir}/public_key.pem"/> -->
      <!-- <param name="ssl-key-path" value="$${certs_dir}/private_key.pem"/> -->
      <!-- <param name="ssl-key-password" value="MyPrivateKeyPassword"/> -->
      <!-- optional timeout -->
      <!-- <param name="timeout" value="10"/> -->

      <!-- optional: use a custom CA certificate in PEM format to verify the peer
           with. This is useful if you are acting as your own certificate authority.
           note: only makes sense if used in combination with "enable-cacert-check."
      <!-- <param name="ssl-cacert-file" value="$${certs_dir}/cacert.pem"/> -->

      <!-- optional: specify the SSL version to force HTTPS to use. Valid options are
           "SSLv3" and "TLSv1". Otherwise libcurl will auto-negotiate the version. --
      <!-- <param name="ssl-version" value="TLSv1"/> -->

      <!-- optional: enables cookies and stores them in the specified file. -->
      <!-- <param name="cookie-file" value="$${temp_dir}/cookie-mod_xml_curl.txt"/> -

      <!-- one or more of these imply you want to pick the exact variables that are t
      <!--<param name="enable-post-var" value="Unique-ID"/>-->

    </binding>

    <binding name="directory">
      <param name="gateway-url" value="http://192.168.1.173:20501/freeswitch/dicctor
    </binding>

  </bindings>
</configuration>
```

2.4. 呼叫慢

sudo vim /usr/local/freeswitch/etc/freeswitch/dialplan/default.xml

```
    <condition field="${default_password}" expression="^1234$" break="never">
        <action application="log" data="CRIT WARNING WARNING WARNING WARNING WARNING
        <action application="log" data="CRIT Open $${conf_dir}/vars.xml and change th
        <action application="log" data="CRIT Once changed type 'reloadxml' at the con
        <action application="log" data="CRIT WARNING WARNING WARNING WARNING WARNING
        <action application="sleep" data="3000"/>
    </condition>
```

2.5 重启后 `failure to connect to CORE_DB`

答案地址:http://comments.gmane.org/gmane.comp.telephony.freeswitch.user/72474
(https://link.jianshu.com?
t=http://comments.gmane.org/gmane.comp.telephony.freeswitch.user/72474)

```
rm /usr/local/freeswitch/var/lib/freeswitch/db/core.db
```

3. 拨号计划

3.1 相关文档

- XML Dialplan (https://link.jianshu.com?
  t=https://freeswitch.org/confluence/display/FREESWITCH/XML+Dialplan)
- 认识拨号计划 - Dialplan (https://link.jianshu.com?
  t=http://www.freeswitch.org.cn/2010/10/23/ren-shi-bo-hao-ji-hua-dialplan.html)
- FreeSWITCH中的XML拨号计划 (https://link.jianshu.com?
  t=http://www.freeswitch.org.cn/2009/11/22/freeswitchzhong-de-xmlbo-hao-ji-
  hua.html)
- 拨号计划 `curl` (https://link.jianshu.com?
  t=https://wiki.freeswitch.org/wiki/Mod_curl#Dialplan_Application)
- 通话记录地址 `/usr/local/freeswitch/var/log/freeswitch/cdr-csv/Master.csv`

3.2 安装 `mod_curl` 和 `mod_flite`

3.2.1 配置 `modules.conf`

```
sudo vim /home/mintcode/freeswitch/modules.conf
```

```
applications/mod_curl
asr_tts/mod_flite
```

3.2.2 安装 `libflite-devel`
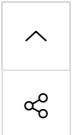
```
$ cd libs/
$ git clone https://freeswitch.org/stash/scm/sd/libflite.git
$ cd libflite/
$ ./configure  --enable-pic --disable-static --enable-shared && make
$ sudo make install
$ sudo cp /usr/local/lib/pkgconfig/flite.pc /usr/lib64/pkgconfig
```

3.2.3 重新编译

```
$ cd /home/mintcode/freeswitch
$ ./configure --prefix=/usr/local/freeswitch
$ make
$ sudo make install
```

3.2.4 配置 `modules.conf.xml`

```
sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/modules.conf.xml
```

```
<load module="mod_curl"/>
<load module="mod_flite"/>
```

3.3 构建拨号计划 `00_fsm.xml`

`sudo vim /usr/local/freeswitch/etc/freeswitch/dialplan/public/00_fsm.xml`

1. `continue` 默认把它设置为false，设为true表示FS在当前分机号的所有action都解析成功是否继续。
2. `break` 表示判断后的行为，有以下值：

On-true：第一次匹配后停止查找 `<br />`

On-false：默认值，第一次失败后停止查找 `<br />`

Always：不管匹配与否都停止 `<br />`

Never： 无论匹配与否都继续查找 `<br />`

```xml
<include>
  <extension name="public_fsm">
        <condition field="${channel_name}" expression="@([^@]*)$" break="never" >
          <action application="set" data="domain_name=$1"/>
        </condition>
        <condition field="destination_number" expression="^fsm" break="never">
            <action application="set" data="continue_on_fail=true"/>
            <action application="curl" data="http://192.168.1.173:20500/savefsinfo/t
            <action application="log" data="${curl_response_data}" />
            <action application="sleep" data="3000"/>
            <action application="bridge" data="user/${destination_number}@${domain_r
            <!--
            <action application="answer"/>
            <action application="sleep" data="1000"/>
            -->
            <!-- speak words -->
            <!--
            <action application="set" data="tts_engine=flite"/>
            <action application="set" data="tts_voice=slt"/>
            <action application="speak" data="Jingle bells  Jingle bells  jingle all
            -->
            <!-- call api http://192.168.1.173:2015/ -->
            <!--
            <action application="curl" data="http://192.168.1.173:20500/savefsinfo/t
            <action application="log" data="${curl_response_data}" />
            -->
        </condition>
        <condition field="${default_password}" expression="^1234$" break="never">
          <action application="sleep" data="1000"/> -->
          <action application="bridge" data="user/${destination_number}@${domain_name
        </condition>
  </extension>
</include>
```

3.3.1 `MSB` 配置

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<routes xmlns="http://camel.apache.org/schema/spring">
  <route>
    <from uri="netty4-http:http://{{msb.hostName}}:{{restful.port}}/savefsinfo/{route
    />
    <convertBodyTo type="java.lang.String" />
    <setHeader headerName="CamelRedis.Key">
      <simple>
        fs:${header.routerId}
      </simple>
    </setHeader>
    <setHeader headerName="CamelRedis.Value">
      <javaScript>
        var result={ 'appName': 'launchr', 'appToken':'verify-code' }; request.body.s
        key=a.split('=');result[key[0]]=key[1]}); result.case=result.case||'USER_NOT_
        result.userName=result.caller_id_name; result.to=[result.destination_number];
        request.body=JSON.stringify(result);
      </javaScript>
    </setHeader>
    <to uri="spring-redis://{{redis.hostName}}:{{redis.port}}?command=SET&serializer=
    />
    <removeHeaders pattern="*" />
    <setHeader headerName="Content-Type">
      <constant>
        application/json
      </constant>
    </setHeader>
    <setHeader headerName="CamelHttpMethod">
      <constant>
        POST
      </constant>
    </setHeader>
    <to uri="netty4-http:http://192.168.1.251:20001/launchr/chat/voip" />
  </route>
</routes>
```

(/apps/redirect?
utm_source=side-
banner-click)

3.4 拨号计划参数

变量 (https://link.jianshu.com?t=https://freeswitch.org/confluence/display/FREESWITCH/Channel+Variables#ChannelVariables-InfoApplicationVariableNames(variable_xxxx))名称	描述
caller_id_name	呼叫方的名称
destination_number	呼叫方所拨打
direction	当前呼叫段是
channel_name	此调用的入站 如: sofia/sal
state (https://link.jianshu.com?t=https://wiki.freeswitch.org/wiki/Channel_States)	状态，例如 c
bridge_hangup_cause (https://link.jianshu.com?t=https://wiki.freeswitch.org/wiki/Hangup_Causes)	呼叫结束原因 NORMAL_CLEAR
last_bridge_hangup_cause	最后呼叫结束

动作	描述
answer	应答呼叫
bridge	桥叫到另一会话
log	日志文件中写入一条消息
hangup	断开呼叫
playback	播放音频文件或音流
set	通道设置变量
transfer	转移呼叫到另一个会话

3.5 拨号记录CDR (https://link.jianshu.com?t=https://freeswitch.org/confluence/display/FREESWITCH/CDR)

3.5.1 采用 `mod_odbc_cdr` (https://link.jianshu.com?t=https://freeswitch.org/confluence/display/FREESWITCH/mod_odbc_cdr)模块

3.5.1.1 配置 `modules.conf`

sudo vim /home/mintcode/freeswitch/modules.conf

```
event_handlers/mod_cdr_sql
event_handlers/mod_json_cdr
```

3.5.1.2 编译安装

```
$ sudo yum install unixODBC mysql-connector-odbc -y
$ sudo make mod_odbc_cdr
$ sudo make mod_odbc_cdr-install
$ sudo cp /home/mintcode/freeswitch/src/mod/event_handlers/mod_odbc_cdr/conf/autoloa
```

```
$ sudo make mod_json_cdr
$ sudo make mod_json_cdr-install
$ sudo cp /home/mintcode/freeswitch/src/mod/event_handlers/mod_json_cdr/conf/autoloa
```

3.5.1.3 配置 `modules.conf.xml`

sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/modules.conf.xml

```
    <load module="mod_odbc_cdr"/>
    <load module="mod_json_cdr"/>
```

3.5.1.4 配置 `odbc_cdr.conf.xml`

sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/odbc_cdr.conf.xml

```
    <param name="odbc-dsn" value="odbc://DRIVER=mysql;SERVER=192.168.1.249;UID=root;PWD=
```

sudo vim /usr/local/freeswitch/etc/freeswitch/autoload_configs/json_cdr.conf.xml

```
    <param name="url" value="http://192.168.2.92:20001/launchr/chat/voipcdr"/>
```

3.5.1.5 生成表

```
CREATE TABLE cdr_table_a_leg (
  CallId varchar(50) DEFAULT NULL,
  orig_id varchar(50) DEFAULT NULL,
  term_id varchar(50) DEFAULT NULL,
  ClientId varchar(50) DEFAULT NULL,
  IP varchar(50) DEFAULT NULL,
  IPInternal varchar(50) DEFAULT NULL,
  CODEC varchar(50) DEFAULT NULL,
  directGateway varchar(50) DEFAULT NULL,
  redirectGateway varchar(50) DEFAULT NULL,
  CallerID varchar(50) DEFAULT NULL,
  TelNumber varchar(50) DEFAULT NULL,
  TelNumberFull varchar(50) DEFAULT NULL,
  sip_endpoint_disposition varchar(50) DEFAULT NULL,
  sip_current_application varchar(50) DEFAULT NULL
);
CREATE TABLE cdr_table_b_leg (
  CallId varchar(50) DEFAULT NULL,
  orig_id varchar(50) DEFAULT NULL,
  term_id varchar(50) DEFAULT NULL,
  ClientId varchar(50) DEFAULT NULL,
  IP varchar(50) DEFAULT NULL,
  IPInternal varchar(50) DEFAULT NULL,
  CODEC varchar(50) DEFAULT NULL,
  directGateway varchar(50) DEFAULT NULL,
  redirectGateway varchar(50) DEFAULT NULL,
  CallerID varchar(50) DEFAULT NULL,
  TelNumber varchar(50) DEFAULT NULL,
  TelNumberFull varchar(50) DEFAULT NULL,
  sip_endpoint_disposition varchar(50) DEFAULT NULL,
  sip_current_application varchar(50) DEFAULT NULL
);
CREATE TABLE cdr_table_both (
  CallId varchar(50) DEFAULT NULL,
  orig_id varchar(50) DEFAULT NULL,
  TEST_id varchar(50) DEFAULT NULL
);
```

4. 配置 wss 实现 webrtc

配置方案 (https://link.jianshu.com?
t=https://freeswitch.org/confluence/display/FREESWITCH/WebRTC)

5. freeswitch 端口

5.1 基本端口

```
FireWall Ports  Network Protocol    Application Protocol    Description

1719     UDP H.323 Gatekeeper RAS port

1720     TCP H.323 Call Signaling

3478     UDP STUN service     Used for NAT traversal

3479     UDP STUN service     Used for NAT traversal

5002     TCP MLP protocol server

5003     UDP Neighborhood service

5060     UDP & TCP    SIP UAS Used for SIP signaling (Standard SIP Port, for default I

5070     UDP & TCP    SIP UAS Used for SIP signaling (For default "NAT" Profile)

5080     UDP & TCP     SIP UAS Used for SIP signaling (For default "External" Profile)

8021     TCP ESL Used for mod_event_socket *

16384-32768 UDP RTP/ RTCP multimedia streaming  Used for audio/video data in SIP and

5066     TCP Websocket    Used for WebRTC

7443     TCP Websocket    Used for WebRTC
```

5.2 rtp 端口范围

conf/autoload_configs/switch.conf.xml

```
<param name="rtp-start-port" value="16384"/>
<param name="rtp-end-port" value="16389"/>
```

(/apps/redirect?
utm_source=side-
banner-click)

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> (/u/5a2c57bdd7ce)
>
> ＋关注
>
> 前端攻城师 后端爱好者 运维玩耍者

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❚ 被以下专题收入，发现更多相似内容

FS   (/c/4fc5154f0496?utm_source=desktop&utm_medium=notes-included-collection)

php+mysql+apache+centos 编译安装 (/p/88ed9ca60060?utm_campaig…

php+mysql+apache+centos 编译安装 领导要求先保证php环境稳定，然后再去考虑其他，例如性能，安全等等，所以先参考yum的php+mysql+apache的配置来建造。so，就是这样子，按照yum的软件版本和配置重…

线上猛如虎_线下怂如鼠 (/u/dnaEMx?
utm_campaign=maleskine&utm_content=user&utm_medium=seo_notes&utm_source=recommendation)

Mysql for windows 安装 (/p/852117bc7dd0?utm_campaign=maleskine…

Action 13:28:27: INSTALL. 1: MySQL Notifier 1.1.7 2: {724CDD73-430E-47DA-8F4E-7DF2000BA268}
Action 13:28:27: FindRelatedProducts. Searchi...

__jwzhang__ (/u/45283923c361?
utm_campaign=maleskine&utm_content=user&utm_medium=seo_notes&utm_source=recommendation)

Ubuntu完全教程，让你成为Ubuntu高手！ (/p/0ae245cfe1cf?utm_campa…

Ubuntu的发音 Ubuntu，源于非洲祖鲁人和科萨人的语言，发作 oo-boon-too 的音。了解发音是有意义的，您不是第一个为此困惑的人，当然，也不会是最后一个：）大多数的美国人读 ubuntu 时，将 u 作为元音发…

萤火虫de梦 (/u/8dd62859837d?
utm_campaign=maleskine&utm_content=user&utm_medium=seo_notes&utm_source=recommendation)

(/p/5996e214cf1a?

(/apps/redirect?
utm_source=side-
banner-click)

utm_campaign=maleskine&utm_content=note&utm_medium=seo_notes&utm_source=recommendation)
Linux-Server-Notes (/p/5996e214cf1a?utm_campaign=maleskine&utm…
Linux-Server-Notes PMS /home/softwareluke/图片/2017-09-11 09-09-33屏幕截图.png 2 ifconfig3 init 04 ip
a5 vim /etc/sysconfig/network-scripts...
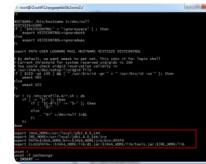
IT诸葛亮 (/u/d2f49eb35efe?
utm_campaign=maleskine&utm_content=user&utm_medium=seo_notes&utm_source=recommendation)

(/p/2f1202d61185?

utm_campaign=maleskine&utm_content=note&utm_medium=seo_notes&utm_source=recommendation)
CentOS 配置JDK以及Tomcat和Apache的整合 (/p/2f1202d61185?utm_ca…
最近在 Linux 下成功整合了 Tomcat 和 Apache，其中难免踩了各种坑，在这里记录下过程以便大家学习。首
先，为什么要整合 Tomcat 和 Apache 呢？网上有一大把博客详解，我就简洁概括： Tomcat 是应用（Java…

王苍天 (/u/e5bcc7954942?
utm_campaign=maleskine&utm_content=user&utm_medium=seo_notes&utm_source=recommendation)

(/p/a381d2ce6f45?

utm_campaign=maleskine&utm_content=note&utm_medium=seo_notes&utm_source=recommendation)
然并卵 (/p/a381d2ce6f45?utm_campaign=maleskine&utm_content=not…
某次去旅游，在香港机场。一位外国女士用英文与我交流。大致意思是说:你好，你的鞋子很漂亮。其实有听
懂，但是心虚又紧张，英语太糟糕，估计无法面对接下来的交流，只能说了句谢谢。 年幼无知时候，恬不…

心怡2015 (/u/c1dd5a05d5c8?
utm_campaign=maleskine&utm_content=user&utm_medium=seo_notes&utm_source=recommendation)

随感 (/p/659253d27f1a?utm_campaign=maleskine&utm_content=note…
只言片语 说尽天下英雄事 古往今来 流干无数豪杰血

Recoder (/u/VygCir?
utm_campaign=maleskine&utm_content=user&utm_medium=seo_notes&utm_source=recommendation)

莫蹉跎 (/p/d90a62faa5f9?utm_campaign=maleskine&utm_content=not…
问伊芳龄是几何？ 何故寂寞叹蹉跎。 有情终归成眷属， 不必忧心消日多。 作者王永豪

王永豪 (/u/52b391b14ac6?
utm_campaign=maleskine&utm_content=user&utm_medium=seo_notes&utm_source=recommendation)