



记saltstack与zabbix的一次联姻

-- 基于saltstack结合zabbix
完成服务自动化部署及监控



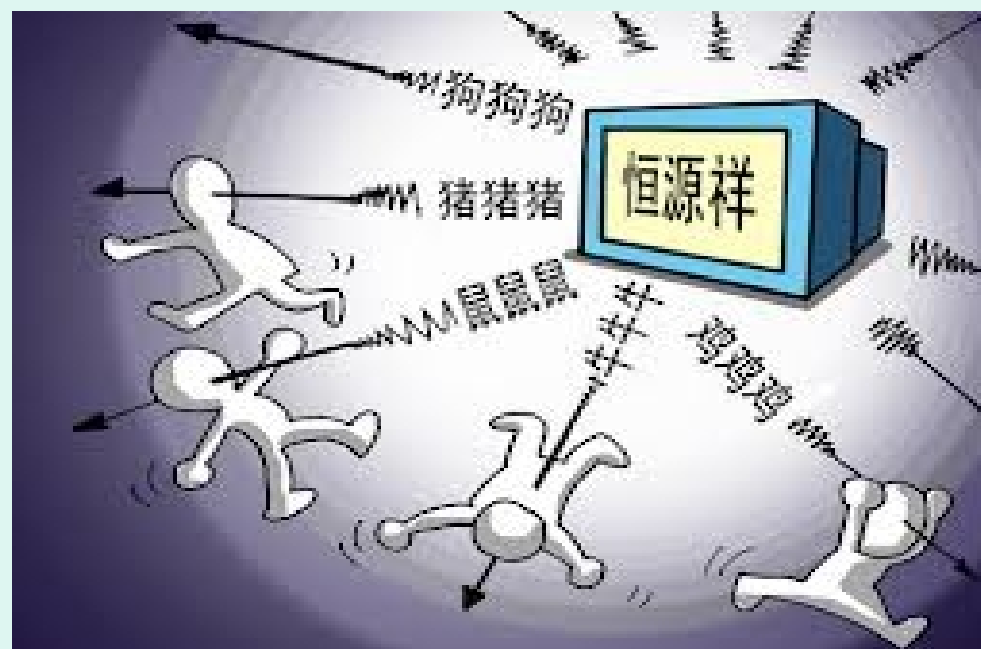


About me

- 绿肥(@绿小小肥)
- Blog: <http://pengyao.org/>
- Zabbix爱好者、SaltStack爱好者
- 中国SaltStack用户组发起人

AD

- 广告很短，不要走开，广告之后很精彩





CSSUG

- 中国SaltStack用户组(China SaltStack User Group, aka "CSSUG")
- 非官方，由国内SaltStack爱好者、使用者组成
- 当前主要推广SaltStack在运维中的使用
- 当前建立有wiki和QQ群
- Wiki: <http://wiki.saltstack.cn/>
- QQ群: 294953305
- github: <https://github.com/cssug/>



CSSUG Next

- 完善SaltStack知识库，增加应用案例
- 积极参与官方google group
- 积极参与线上/线下交流活动
- 中文文档计划



CSSUG Thanks

- 声明：以下排名不分先后
- halfss、葱油拌面、Rainbow+、zhangmh、范三山、弥留的老鼠 等同学贡献文章或分享心得
- 致谢PUPPET、Chef



About Topic

- 运维自动化的伟大理想
- **PUPPET**虚拟资源与**nagios**结合完成自动化监控的文章
- 巧妇难为无米之炊
- **2013-05-04 Salt 0.15**发布，带来了**Salt Mine**，使这种构想成为可能
- 基于**SaltStack**，结合**Zabbix**完成**memcached**服务自动化部署及监控
- 案例代码: <https://github.com/pengyao/salt-zabbix>

红娘笔记

- 双方家庭情况介绍
- salt主动承担zabbix繁琐的安装工作
- zabbix表现强大的API
- salt表现爱心, 收养memcached
- salt向zabbix坦白: 不好意思, 我收养个娃
- zabbix回应: 太有爱了, 我喜欢你, 你的娃就是我的, 我也会承担抚养义务的
- salt和zabbix, 再带上memcached这个小娃娃, 我们就是幸福的一家, 我们是运维吉祥三宝
- 无计划生育这一基本国策, 孩子越来越多.....



双方家庭情况介绍



知己知彼，百战不殆
——《孙子·谋攻篇》



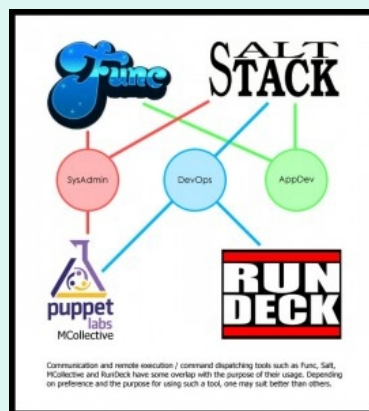
我眼中的salt

- <http://saltstack.org/>
- <https://github.com/saltstack/salt>
- 出生时间: 2011
- 开发语言: python
- 协议: Apache
- C/S结构: minion/master
- 采用长连接方式, 基于zeromq, 支持schedule
- 三大功能:
 - (1) Remote Execution
 - (2) Config Management
 - (3) Cloud Management ?





同门师兄弟比较



- 无意之中看到一篇文章，里边的这张配图让我认识了saltstack
- 转载此图时，无意中被@守住每一天 发现SaltStack下边竟然有三条线.....
- 调侃: stack style，逢stack必火，比如OpenStack、CloudStack

我眼中的Zabbix

- <http://www.zabbix.com/>
- 开发商: Zabbix SIA
- 协议: GPL V2
- 1998年产品概念提出, 2001年第一个GPL版本v0.1发布, 2004年第一个稳定版本v1.0发布, 2005年Zabbix SIA公司成立.....2012年v2.0发布, 谣传6月底v2.2发布, 如果今天还没发布, 那就是又跳票了
- 真开源, 无隐藏(合作、企业)版本
- 监控任何你想要监控的东西
- 其实, 我们也有个Zabbix交流QQ群: 92242469

ZABBIX

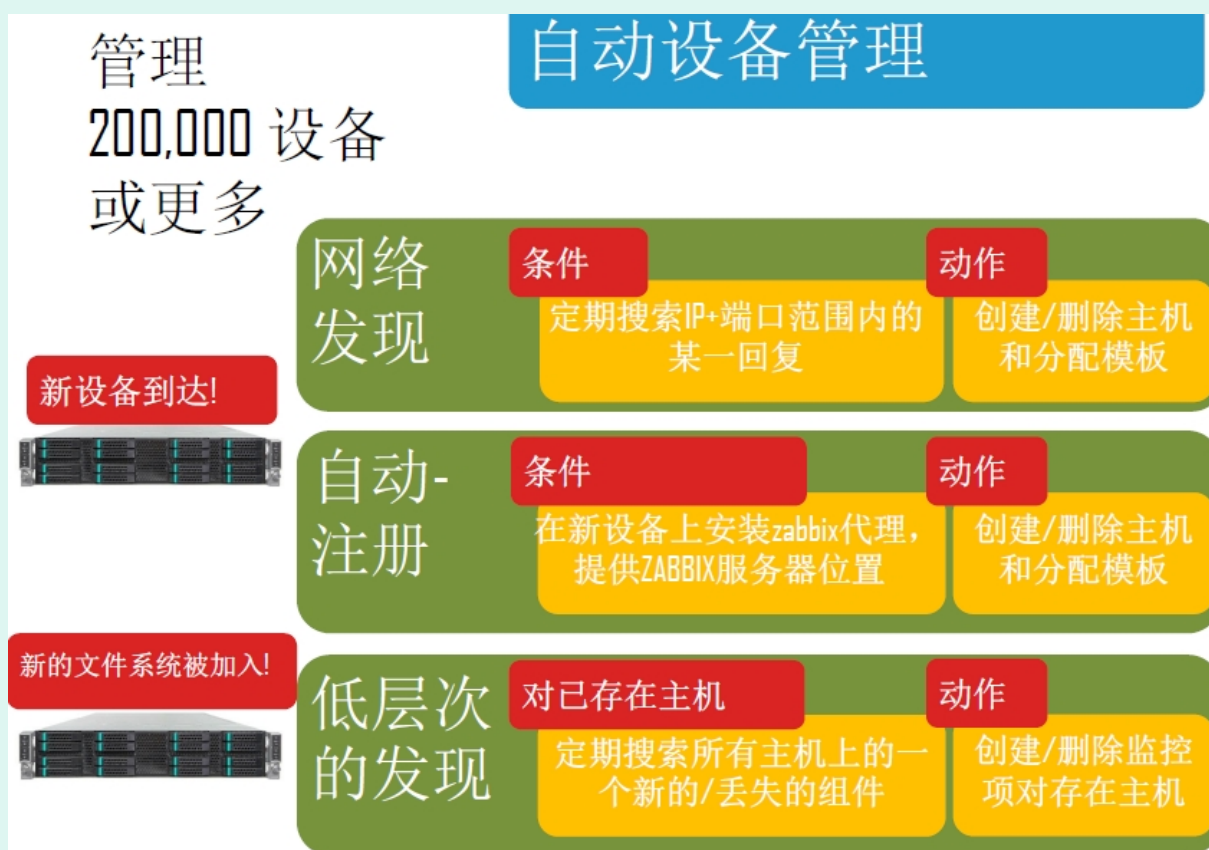
Zabbix Item



- 丰富的数据item收集方式: agent、agent active、simple check、trapper、snmp、snmp trapper、internal、external check、IPMI、ssh、telnet、JMX、web等等

注：本文中引用的图片来自《Zabbix系统概述》

Zabbix Discovery



注：本文中引用的图片来自《Zabbix系统概述》

Zabbix Data Storage

- Zabbix将监控数据存储在数据库中，支持MySQL、PostgreSQL、Oracle、DB2、SQLite，谣传未来将支持NoSQL(like cassandra)
- 扩充性，高可用性(由后端数据库自身技术提供)
- 由于存储在富有特性的关系型数据库中，支持灵活的Trigger表达式
- 可以在任何时候重用存储的数据

Zabbix Action

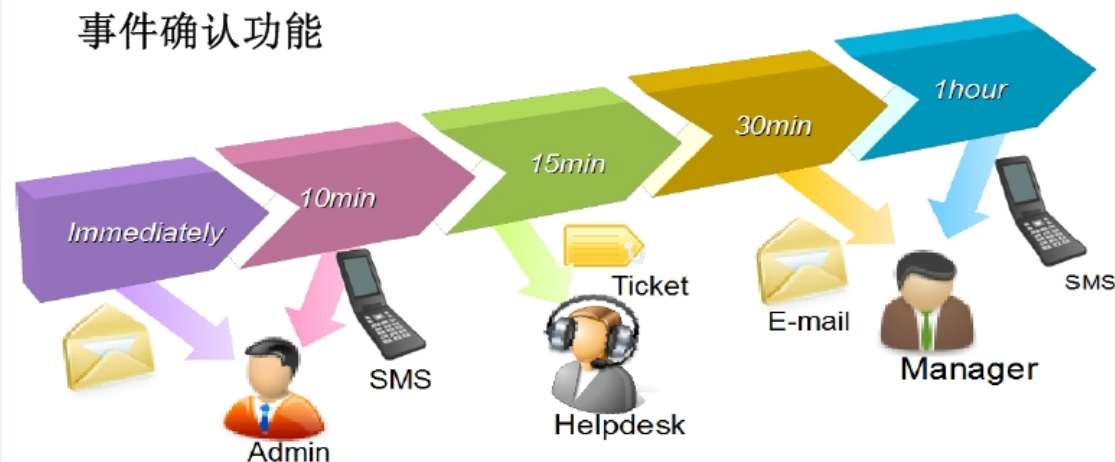
报警

通知方式:

- E-mail, SMS, & Jabber
- 聊天消息
- 执行命令

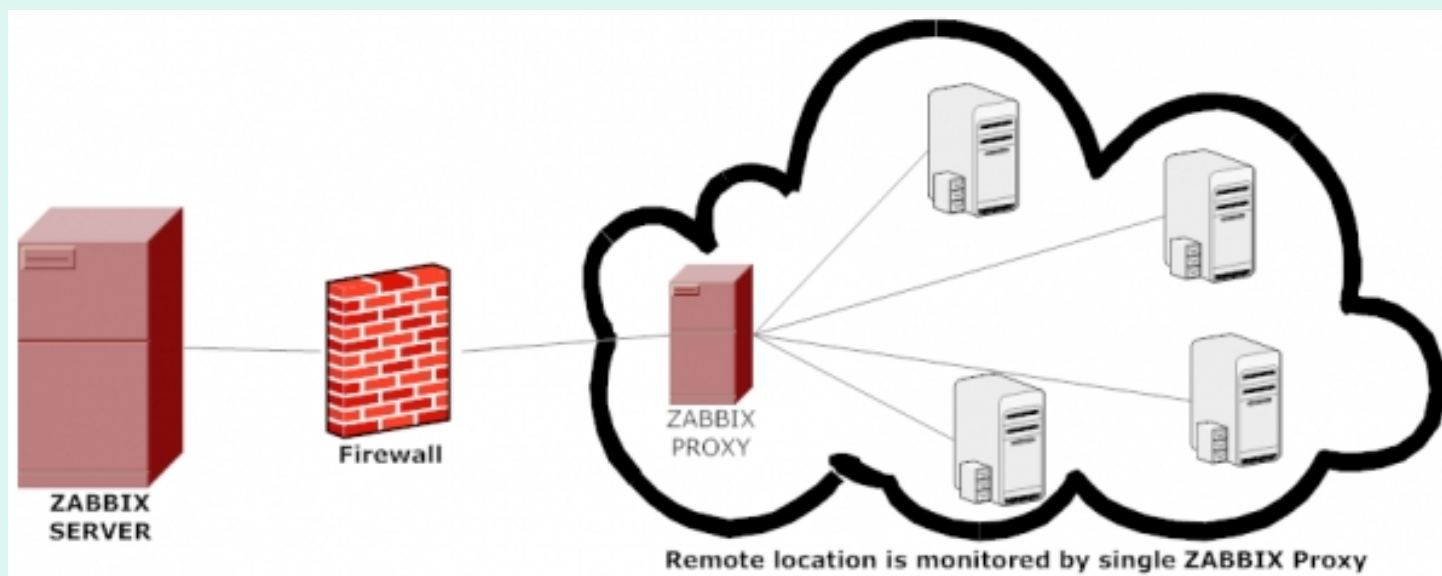
事件确认功能

灵活升级机制



注：本文中引用的图片来自《Zabbix系统概述》

Zabbix Distributed Monitor(proxy)



还支持另外一种更为强大的分布式方案**Node**，不过较为复杂，应用较少，有谣传**Node**当前不成熟，有坑
对**Node**有兴趣的同学可以访问：

https://www.zabbix.com/documentation/2.0/manual/distributed_monitoring/nodes

注：本文中图片来源于《Zabbix Manual》

Zabbix Web

- 提供基于**PHP**开发的可视化**Web**前端
- 基于**php-gd**提供**graph**、**screen**、**map**等图标及可视化元素
- 提供强大的**JSON RPC API**, 轻松完成自动化操控**Zabbix**及与其他第三方系统结合



salt,到你表现的时候了

salt主动承担zabbix繁琐的安装工作

在企业内部，只有成本
--- (美) 彼得·杜拉克

Zabbix安装说明

- 本次数据存储采用MySQL，安装方式采用yum，软件包来源于CentOS Base及EPEL仓库
- 本次Zabbix采用Server-Agent方式，并安装Zabbix Web
- 本安装假设salt已经部署完毕，因为这是一个先有鸡还是先有蛋的问题



测试环境说明

| 序号 | 主机名 | IP | OS版本 | 角色 | salt版本 |
|----|--------------|--------------|----------------------|--|--------|
| 1 | salt-test-01 | 172.16.0.111 | CentOS 6.4 X86_64 | salt master/minion & zabbix server | 0.15.1 |
| 2 | salt-test-02 | 172.16.0.112 | CentOS 6.4 X86_64 | salt minion & zabbix api操作机 | 0.15.1 |
| 3 | salt-test-03 | 172.16.0.113 | CentOS 6.4 X86_64 | salt minion & zabbix agent & memcached | 0.15.1 |

```
$ cat top.sls
base:
  '*':
    - base
    - salt.minion
    - zabbix.agent
  'salt-test-01':
    - salt.master
    - mysql.server
    - zabbix.server
    - zabbix.web
  'salt-test-02':
    - zabbix.api
  'salt-test-03':
    - memcached
```



前置安裝之配置/etc/hosts SLS

```
$ cat base/hosts.sls
```

```
host-salt-test-01:
```

```
  host.present:
```

- ip: 172.16.0.111
- order: 1
- names:
- salt-test-01

```
host-salt-test-02:
```

```
  host.present:
```

- ip: 172.16.0.112
- order: 1
- names:
- salt-test-02

```
host-salt-test-03:
```

```
  host.present:
```

- ip: 172.16.0.113
- order: 1
- names:
- salt-test-03



前置安裝之EPEL配置SLS

```
$ cat base/epel.sls
```

```
epel-repo:
```

```
  pkg.installed:
```

```
    - sources:
```

```
      - epel-release: salt:///base/files/epel-  
release-6-8.noarch.rpm
```

```
    - order: 1
```

Zabbix Server安装流程

- 需要先安装数据库并启动数据库
- 安装Zabbix Server
- 创建Zabbix Server访问数据库及访问用户权限并导入zabbix数据表
- 配置Zabbix Server
- 启动Zabbix Server服务



Zabbix Server数据库安装配置SLS

```
$ cat mysql/server.sls
```

```
include:
```

```
- salt.minion
```

```
mysql-server:
```

```
pkg:
```

```
- installed
```

```
file.managed:
```

```
- name: /etc/my.cnf
```

```
- require:
```

```
- pkg: mysql-server
```

```
service.running:
```

```
- name: mysqld
```

```
- enable: True
```

```
- require:
```

```
- pkg: mysql-server
```

```
- watch:
```

```
- file: mysql-server
```

```
mysql-server-config-minion:
```

```
file.managed:
```

```
- name: /etc/salt/minion.d/mysql.conf
```

```
- source: salt://mysql/files/etc/salt/minion.d/mysql.conf
```

```
- makedirs: True
```

```
- require:
```

```
- service: salt-minion
```



Zabbix Server安装配置SLS

```
$ cat zabbix/server.sls
```

```
include:
```

- salt.minion
- mysql.server

```
zabbix-server:
```

```
pkg.installed:
```

- pkgs:
 - zabbix20-server
 - zabbix20-server-mysql

```
file.managed:
```

- name: /etc/zabbix_server.conf
 - source: salt://zabbix/files/etc/zabbix_server.conf
 - template: jinja
 - defaults:
 - DBHost: localhost
 - DBName: zabbix
 - DBUser: zabbix
 - DBPassword: zabbix_pass
 - DBSocket: /var/lib/mysql/mysql.sock
 - DBPort: 3306
 - require:
 - pkg: zabbix-server
- ```
service.running:
```
- enable: True
  - watch:
    - file: zabbix-server

```
zabbix-server-role:
```

```
file.append:
```

- name: /etc/salt/roles
- text:
  - 'zabbix-server'
- require:
  - file: roles
  - service: zabbix-server
  - service: salt-minion
- watch\_in:
  - module: sync\_grains

```
zabbix_server.conf-link:
```

```
file.symlink:
```

- name: /etc/zabbix/zabbix\_server.conf
- target: /etc/zabbix\_server.conf
- require\_in:
  - service: zabbix-server
- require:
  - pkg: zabbix-server
  - file: zabbix-server

```
zabbix_mysql:
```

```
mysql_database.present:
```

- name: zabbix
- ```
mysql_user.present:
```
- name: zabbix
 - host: localhost
 - password: zabbix_pass
 - require:
 - mysql_database: zabbix_mysql

```
mysql_grants.present:
```

- grant: all
- database: zabbix.*
- user: zabbix
- host: localhost
- require:
 - mysql_user: zabbix_mysql
- require_in:
 - service: zabbix-server

```
zabbix_mysql-init:
```

```
cmd.run:
```

- name: mysql -uroot zabbix < /usr/share/zabbix-mysql/schema.sql && mysql -uroot zabbix < /usr/share/zabbix-mysql/images.sql && mysql -uroot zabbix < /usr/share/zabbix-mysql/data.sql
- unless: mysql -uroot -e "SELECT COUNT(*) from zabbix.users"
- require:
 - pkg: zabbix-server
 - mysql_grants: zabbix_mysql
- require_in:
 - file: zabbix-server
 - service: zabbix-server



Zabbix Agent安装流程

- 安装Zabbix Agent软件包
- 配置Zabbix Agent
- 启动Zabbix Agent服务



Zabbix Agent安装配置SLS

```
$ cat zabbix/agent.sls
```

```
include:
```

- salt.minion

```
zabbix-agent:
```

```
  pkg.installed:
```

- name: zabbix20-agent

```
  file.managed:
```

- name: /etc/zabbix_agentd.conf
- source: salt://zabbix/files/etc/zabbix_agentd.conf
- template: jinja
- defaults:
 - Server: {{ pillar['zabbix-agent']['Zabbix_Server'] }}
- require:
 - pkg: zabbix-agent

```
  service.running:
```

- enable: True
- watch:
 - pkg: zabbix-agent
 - file: zabbix-agent

```
zabbix-agent-role:
```

```
  file.append:
```

- name: /etc/salt/roles
- text:
 - 'zabbix-agent'
- require:
 - file: roles
 - service: zabbix-agent
 - service: salt-minion
- watch_in:
 - module: sync_grains

```
zabbix_agentd_conf-link:
```

```
  file.symlink:
```

- name: /etc/zabbix/zabbix_agentd.conf
- target: /etc/zabbix_agentd.conf
- require_in:
 - service: zabbix-agent
- require:
 - pkg: zabbix-agent
 - file: zabbix-agent

```
zabbix_agentd.conf.d:
```

```
  file.directory:
```

- name: /etc/zabbix/zabbix_agentd.conf.d
- watch_in:
 - service: zabbix-agent
- require:
 - pkg: zabbix-agent
 - file: zabbix-agent



Zabbix Web安装流程

- 安装配置Apache
- 安装配置PHP
- 安装Zabbix Web



Zabbix Web之安装配置Apache SLS

```
$ cat apache/init.sls
apache:
  pkg.installed:
    - name: httpd
  file.managed:
    - name: /etc/httpd/conf/httpd.conf
    - require:
      - pkg: apache
  service.running:
    - name: httpd
    - enable: True
    - watch:
      - pkg: apache
      - file: apache

httpd-conf.d:
  file.directory:
    - name: /etc/httpd/conf.d/
    - watch_in:
      - service: apache
```



Zabbix Web之安装配置PHP SLS

```
$ cat php/init.sls
```

```
include:
```

```
- apache
```

```
php:
```

```
  pkg.installed:
```

```
    - name: php
```

```
  file.managed:
```

```
    - name: /etc/php.ini
```

```
    - source: salt://php/files/etc/php.ini
```

```
    - require:
```

```
      - pkg: php
```

```
    - watch_in:
```

```
      - service: apache
```



安装配置Zabbix Web SLS

```
$ cat zabbix/web.sls
include:
  - apache
  - php
  - salt.minion

zabbix-web:
  pkg.installed:
    - pkgs:
      - zabbix20-web
      - zabbix20-web-mysql
    - watch_in:
      - service: apache
  file.managed:
    - name: /etc/zabbix/web/zabbix.conf.php
    - source: salt://zabbix/files/etc/zabbix/web/zabbix.conf.php
    - require:
      - pkg: zabbix-web

zabbix-web-role:
  file.append:
    - name: /etc/salt/roles
    - text:
      - 'zabbix-web'
    - require:
      - file: roles
    - pkg: zabbix-web
    - service: salt-minion
    - watch_in:
      - module: sync_grains
```




Zabbix部署

```
# salt '*' state.highstate
```

将一键安装Zabbix Server、Zabbix Agent、
Zabbix Web



zabbix, 到了你表现的时候了

低调，低调，本次只表现下api

速度就是一切，它是竞争不可或缺的因素
--- (美) 杰克·韦尔奇

Zabbix API概览

- 基于JSON RPC
- 提供Monitoring、Configuration、Administration功能，无所不能



Zabbix API示例

用户登录API实例，代码来源于Zabbix Manual

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.login",
  "params": {
    "user": "Admin",
    "password": "zabbix"
  },
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "0424bd59b807674191e7d77572075f33",
  "id": 1
}
```

Zabbix API配置说明

- 偷懒，是人的天性，所以本次直接采用 @超大杯摩卡星冰乐 同学的zapi
- 基于zapi，封装了更高级的 `add_monitors.py`
- `add_monitors.py`会Monitor_DIR目录下的监控主机文件，自动完成agent添加及服务模板关联



Zabbix API SLS

```
$ cat zabbix/api.sls
```

```
include:
```

- salt.minion

```
python-zabbix-zapi:
```

```
file.recurse:
```

- name: /usr/lib/python2.6/site-packages/zabbix
- source: salt://zabbix/files/usr/lib/python2.6/site-packages/zabbix
- include_empty: True

```
zabbix-api-role:
```

```
file.append:
```

- name: /etc/salt/roles
- text:
 - 'zabbix-api'
- require:
 - file: roles
 - service: salt-minion
 - file: python-zabbix-zapi
- watch_in:
 - module: sync_grains

```
zabbix-api-config:
```

```
file.managed:
```

- name: /etc/zabbix/api/config.yaml
- source: salt://zabbix/files/etc/zabbix/api/config.yaml
- makedirs: True
- template: jinja
- defaults:
 - Hostgroup: {{pillar['zabbix-api']['Hostgroup']}}
 - Monitors_DIR: {{pillar['zabbix-api']['Monitors_DIR']}}
 - Templates_DIR: {{pillar['zabbix-api']['Templates_DIR']}}
 - Zabbix_User: {{pillar['zabbix-api']['Zabbix_User']}}
 - Zabbix_Pass: {{pillar['zabbix-api']['Zabbix_Pass']}}
 - Zabbix_URL: {{pillar['zabbix-api']['Zabbix_URL']}}

```
zabbix-templates:
```

```
file.recurse:
```

- name: {{pillar['zabbix-api']['Templates_DIR']}}
- source: salt://zabbix/files/etc/zabbix/api/templates
- require:
 - file: python-zabbix-zapi
 - file: zabbix-api-config

```
zabbix-add-monitors-script:
```

```
file.managed:
```

- name: /etc/zabbix/api/add_monitors.py
- source: salt://zabbix/files/etc/zabbix/api/add_monitors.py
- makedirs: True
- mode: 755
- require:
 - file: python-zabbix-zapi
 - file: zabbix-api-config



安装Zabbix API

- `# salt 'salt-test-02' state.sls zabbix.api`
- 将在salt-test-02主机上一键安装Zabbix API脚本等



Salt表现爱心

salt接管memcached部署工作

管理是一种严肃的爱
--- (美) 西洛斯·梅考克



memcached部署流程

- 安装memcached软件包
- 配置memcached软件包
- 启动memcached服务



memcached部署SLS

```
$ cat memcached/install.sls
```

```
include:
```

- zabbix.agent
- salt.minion

```
memcached:
```

```
  pkg.installed:
```

- name: memcached

```
  service.running:
```

- name: memcached
- enable: True
- watch:
- pkg: memcached

```
memcached-role:
```

```
  file.append:
```

- name: /etc/salt/roles
- text:
- 'memcached'
- require:
- file: roles
- service: memcached
- service: salt-minion
- watch_in:
- module: sync_grains



memcached部署

- `# salt 'salt-test-03' state.sls memcached.install`
- 将一键在salt-test-03机器上部署memcached



Salt向Zabbix坦白

不好意思, 我收养了memcached

爱人之间需要坦诚相待

--- 互联网

Salt Mine

- 0.15版本， salt加入了salt mine新特性
- The Salt Mine is used to bridge the gap between setting static variables and gathering live data. The Salt mine is used to collect arbitrary data from minions and store it on the master. This data is then made available to all minions via the mine module.



自定义grains

- 之前细心的同学应该有留意到，在部署服务的同时，会向 **/etc/salt/roles** 文件中追加服务名称

```
$ cat _grains/roles.py
import os.path

def roles():
    """define host roles"""

    roles_file = "/etc/salt/roles"
    roles_list = []

    if os.path.isfile(roles_file):
        roles_fd = open(roles_file, "r")
        for eachroles in roles_fd:
            roles_list.append(eachroles[:-1])
    return {'roles': roles_list}

if __name__ == "__main__":
    print roles()
```



grains使用

- `# salt '*' saltutil.sync_grains`
- `# salt '*' grains.item roles`



将grains roles内容加入到Mine中

```
$ cat pillar/salt/minion.sls
```

```
mine_functions:
```

```
  test.ping: []
```

```
  grains.item: [id, roles, ipv4]
```

注意：本内容放置在pillar中,使用前需要同步
pillar

```
# salt '*' saltutil.refresh_pillar
```




Salt Mine使用

- 更新mine:

```
# salt '*' mine.update
```

- 使用mine

```
# salt 'salt-test-02' mine.get '*' grains.item
```



对应SLS

```
$ cat salt/minion.sls
```

```
.....
```

```
roles:
```

```
  file.managed:
```

```
    - name: /etc/salt/roles
```

```
sync_grains:
```

```
  module.wait:
```

```
    - name: saltutil.sync_grains
```

```
mine_update:
```

```
  module.run:
```

```
    - name: mine.update
```

```
    - require:
```

```
      - module: sync_grains
```

```
salt-minion-role:
```

```
  file.append:
```

```
    - name: /etc/salt/roles
```

```
    - text:
```

```
      - 'salt-minion'
```

```
    - require:
```

```
      - file: roles
```

```
      - service: salt-minion
```

```
    - watch_in:
```

```
      - module: sync_grains
```



见真心

Zabbix回应: 太有爱了, 我喜欢你, 你的娃就是我的, 我也会承担抚养义务的

爱人的肩膀, 风雨我们一起扛
--- 《爱人的肩膀》歌词

Memcached监控说明

- 监控采用zbal/zabbix对应的memcached监控模板及脚本：
<https://github.com/zbal/zabbix>
- 由于采用的zapi基于zabbix 1.8开发, 2.0中配置导入功能暂不支持，本次需要手动导入监控模板.
- 将在“有时间的时候”会对zapi进行移植，移植至2.0，以实现模板自动导入



Memcached监控SLS

```
$ cat memcached/monitor.sls
```

```
include:
```

- zabbix.agent
- memcached.install

```
memcached-monitor-script:
```

```
file.managed:
```

- name: /etc/zabbix/ExternalScripts/zabbix_memcached_check.sh
- source: salt://memcached/files/etc/zabbix/ExternalScripts/zabbix_memcached_check.sh
- user: root
- group: root
- mode: 755
- require:
 - service: memcached

```
memcached-monitor-config:
```

```
file.managed:
```

- name: /etc/zabbix/zabbix_agentd.conf.d/memcached.conf
- source: salt://memcached/files/etc/zabbix/zabbix_agentd.conf.d/memcached.conf
- require:
 - file: memcached-monitor-script
- watch_in:
 - service: zabbix-agent



Zabbix获取Mine并进行自动增加监控SLS

```
$ cat zabbix/api.sls
```

```
.....
{% for each_minion, each_mine in salt['mine.get']('*', 'grains.item').iteritems() %}
monitor-{{each_minion}}:
  file.managed:
    - name: {{pillar['zabbix-api']['Monitors_DIR']}}/{{each_minion}}
    - source: salt://zabbix/files/etc/zabbix/api/monitors/minion
    - makedirs: True
    - template: jinja
    - defaults:
        IP: {{each_mine.ipv4[1]}}
        Roles: {{each_mine.roles}}
        Templates: {{pillar['zabbix-templates']}}
    - order: last
    - require:
        - module: mine_update
  cmd.wait:
    - name: python /etc/zabbix/api/add_monitors.py {{each_minion}}
    - require:
        - file: zabbix-add-monitors-script
    - watch:
        - file: monitor-{{each_minion}}
{% endfor %}
```



Memcached自动部署监控

- 一键部署memcached监控程序

```
# salt 'salt-test-03' state.sls memcached.monitor
```

- 一键自动添加zabbix agent及关联监控模板

```
# salt 'salt-test-02' state.sls zabbix.api
```



我们是幸福的一家

SaltStack终于通过了重重考验,
与Zabbix喜结连理



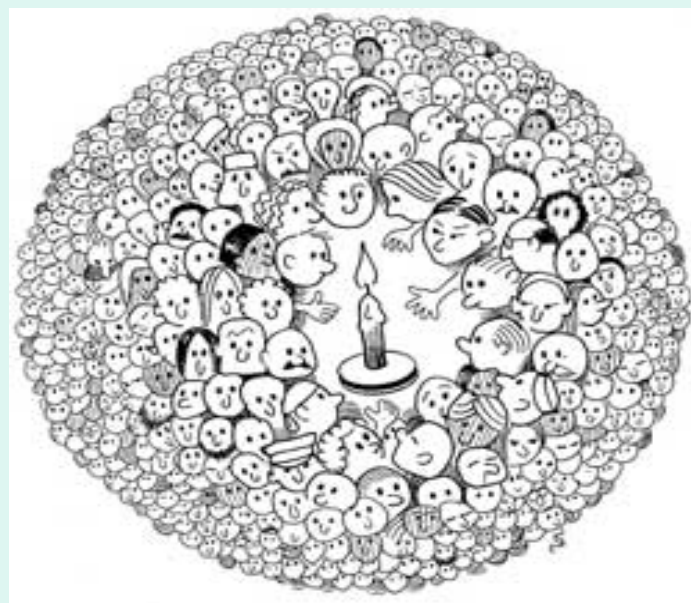
其实，我们可以更简单

- 将state及pillar放在对应位置，配置好top.sls，只需要如下三步：
- 1. 同步pillar及grains
 # salt '*' saltutil.sync_all
- 2. 执行一次state.highstate
 # salt '*' state.highstate
- 3. 再执行一次state.highstate
 # salt 'salt-test-02' state.highstate 或
 # salt 'salt-test-02' state.sls zabbix.api

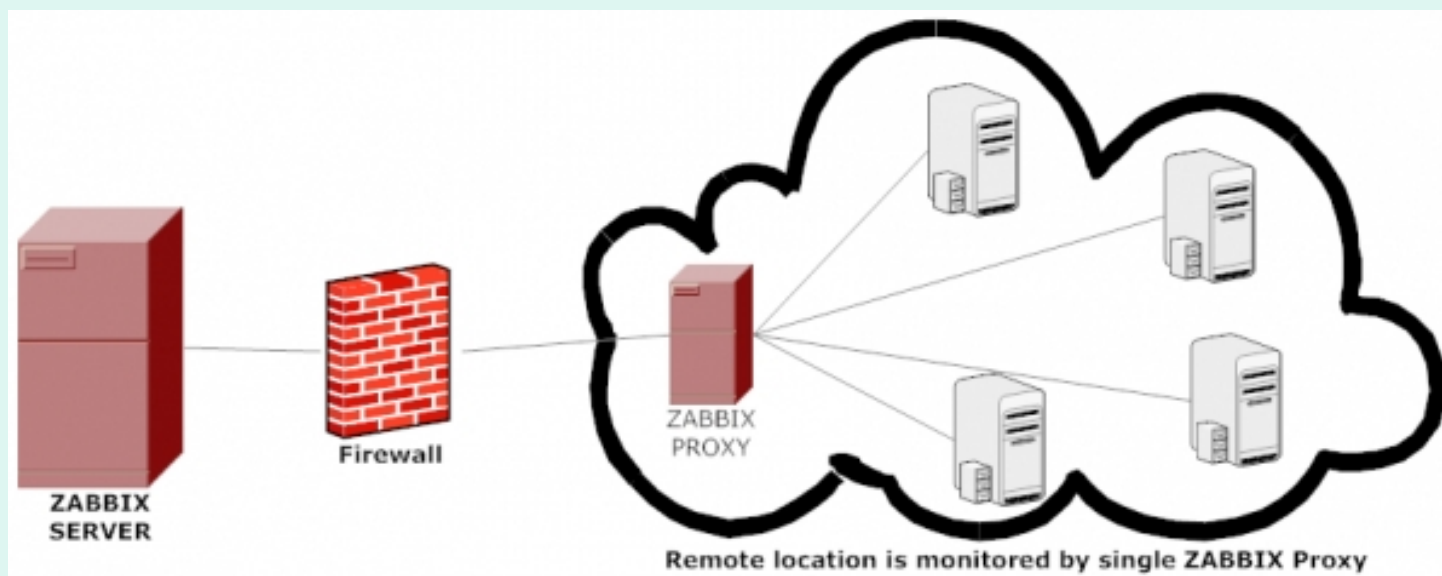
为什么需要第三步？

因为主机间执行是无序的，第一次执行state.highstate会将mine同步至master，第二次执行state.highstate是将mine的数据传递给zabbix api，进行自动监控添加。

孩子越来越多



Zabbix Distributed Monitor(proxy)



还支持另外一种更为强大的分布式方案**Node**，不过较为复杂，应用较少，有谣传**Node**当前不成熟，有坑
对**Node**有兴趣的同学可以访问：

https://www.zabbix.com/documentation/2.0/manual/distributed_monitoring/nodes

注：本文中图片来源于《Zabbix Manual》



SaltStack扩容

- SaltStack支持syndic
- 0.16版本增加Multi-Master特性
- 不好意思，以上内容还没进行测试.....



欢迎拥抱SaltStack

工欲善其事，必先利其器
--- 孔子·《论语·卫灵公》



欢迎贡献和分享SaltStack使用经验及心得

<http://saltstack.cn/>

开源传万世，因有我参与
--- 互联网



FAQ