Schrödinger's Backup

The state of backup

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OSBConf 2018

26 September 2018

Schrödinger's
Backup

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Introduction
Techniques
Snapshot
Configuration
Data
Dumping
Applications
Data

Checking

Conclusion

The End

$ whoami

Toshaan Bharvani - VanTosh

- From Antwerp, Belgium
- Self-employed engineer, trainer, consultant, http://www.vantosh.com
- Involved with Enterprise OS : PEL, RHEL, CentOS, IBM AIX, OpenBSD, FreeBSD, SLES, . . .
- Likes to keep everything secure : SELinux, WebSec, . . .
- Lives in a virtual world : KVM, Xen, LXC, PowerVM, z/VM, . . .
- Likes automation CfgMgmt / DevOps : Ansible, Foreman, Puppet, Mosquitto
- Works on both hardware and software side
- Wants to take over the universe
- Twitter : @toshywoshy
- Blog : http://www.toshaan.com

Schrödinger's
Backup

Toshaan
Bharvani

Introduction

Techniques

Snapshot

Configuration

Data
Dumping

Applications

Data

Checking

Conclusion

The End

Table of contents

1 Introduction

2 Techniques
    Snapshot
    Configuration
    Data Dumping
    Applications
    Data

3 Checking

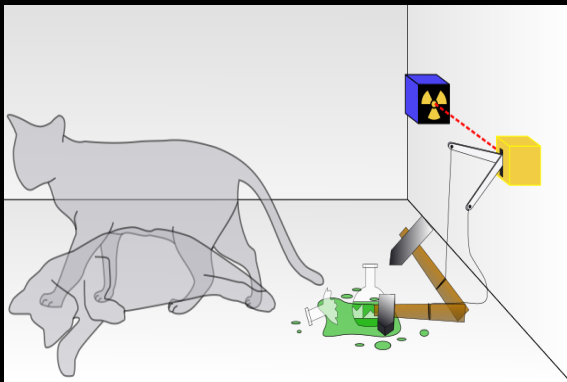**4** Conclusion

1

Introduction

Erwin Schrödinger

- 12 August 1887 - 4 January 1961
- Vienna, Austria
- The father of quantum physics
- Nobel Price winner for quantum physics (1933)

$$i\hbar\frac{\partial}{\partial t}\Psi = \hat{H}\Psi$$

Schrödinger's Cat

- Cat
- Radioactive poison
- Geiger meter

-

Schrödinger's Backup

- Operating System
- Application
- Configuration
- Data

$$2$$

Techniques

Different paths

- Snapshot
  - Operating System
- Dumping
  - Databases
- Copying
  - File system
- Builtin
  - Application

Snapshot

- Machine based
  - Metal : rear, clonezilla, puppet, ansible, chef, . . .
  - KVM (qemu+libvirt) : virsh snapshot-create-as
  - VMWare : CreateSnapshot
  - . . .
- Disk based
  - LVM snapshot
  - Btrfs snapshot
  - ZFS snapshot
  - JFS2 snapshot
  - UFS2 snapshot
  - VSS : Volume Snapshot Service / Volume Shadow
    Copy Service

Testing snapshots

- Test outside of business hours
- Extra metal to test recovery
- Create a new virtual environment for testing recovery
- "Drill's" or recovery test days
- . . .

Configuration

- Codify your configuration
- Automation through templating
- Build your configuration as you build applications
- Use configuration management tooling
  - Ansible
  - Puppet
  - Chef
  - . . .

Piwik Installation

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Introduction

Techniques

Snapshot

Configuration

Data Dumping

Applications

Data

Checking

Conclusion

The End

```
 1  - name: get latest piwik zip file
 2    get_url:
 3      url: https://builds.piwik.org/piwik.zip
 4      dest: /var/www/stats/piwik.zip
 5      force: yes
 6    tags: update
 7
 8  - name: unzip file to destination
 9    unarchive:
10      src: /var/www/stats/piwik.zip
11      dest: /var/www/stats/
12      owner: nginx
13      group: nginx
14      mode: 0775
15      setype: httpd_sys_content_t
16      copy: no
17    tags: update
18
19  - name: copy config file
20    template:
21      src: config.ini.php
22      dest: /var/www/stats/piwik/config/config.ini.php
23      owner: nginx
24      group: nginx
25      mode: 0775
26      setype: httpd_sys_content_t
27    tags: update
```

Piwik Configuration Template

```
 1  ; <?php exit; ?>
 2  [database]
 3  host = "{{ piwikdbserver }}"
 4  username = "{{ piwikdbusername }}"
 5  password = "{{ piwikdbpassword }}"
 6  dbname = "{{ piwikdbname }}"
 7  tables_prefix = "{{ piwikdbprefix }}"
 8  adapter = "MYSQLI"
 9
10  [General]
11  salt = "{{ piwiksalt }}"
12  site_selector_max_sites = 10
13  API_datatable_default_limit = 50
14  session_save_handler = "dbtable"
15  login_cookie_name = "vtstats_auth"
16  login_cookie_expire = 86400
17  language_cookie_name = "vtstats_lang"
18  noreply_email_address = "noreply@vantosh.com"
19  enable_framed_logins = 0
20  reverse_proxy = 1
21  trusted_hosts[] = "stats.vantosh.com"
22  proxy_client_headers[] = "HTTP_X_FORWARDED_FOR"
23  proxy_client_headers[] = "HTTP_CF_CONNECTING_IP"
24  proxy_client_headers[] = "HTTP_CLIENT_IP"
25  proxy_host_headers[] = "HTTP_X_FORWARDED_HOST"
26  enable_sql_optimize_queries = 1
27  force_ssl = 1
28  enable_framed_pages = 0
29  enable_framed_settings = 0
```

Windows Installation and configuration

```
 1  - name: Download your special
 2    win_get_url:
 3      url: https://files.vantosh.com/your/favourite/winapp.exe
 4      dest: C:\Users\User\WinApp.exe
 5
 6  - name: Install an MSI, and wait for it to complete before
      continuing
 7    win_msi:
 8      path: C:\Users\User\WinApp.exe
 9      wait: true
10
11  - name: Add or update registry path MyCompany, with entry 'hello'
      , and containing binary data in hex-string format
12    win_regedit:
13        path: HKCU:\Software\VanTosh
14        name: License
15        data: hex:be,ef,be,ef,be,ef,be,ef,be,ef
16        type: binary
```

PostgreSQL

```
1   /usr/bin/pg_dump \
2       --blobs \
3       --create \
4       --username=postgres \
5       --format=plain \
6       --file $PATH/$BACKUPFILENAME$NOW.sql \
7       $DBNAME
8
9   /bin/diff -ruN $PATH/$BACKUPFILENAME$NOW.sql $PATH/
        $BACKUPFILENAME$OLD.sql
10
11  /usr/bin/xz -9 --threads=0 $PATH/$BACKUPFILENAME$NOW.sql
```

MySQL, MariaDB, Percona

```
1  /bin/mysqldump \
2    --user=root \
3    --password=MyVerySecurePassword \
4    --complete-insert \
5    --extended-insert \
6    --compact \
7    --skip-comments \
8    --quick \
9    --compress \
10   --create-options \
11   --single-transaction \
12   $DBNAME > $PATH/$BACKUPFILENAME$NOW.sql
13
14 /bin/diff -ruN $PATH/$BACKUPFILENAME$NOW.sql $PATH/
     $BACKUPFILENAME$OLD.sql
15
16 /bin/xz -9 -e -T0 $PATH/$BACKUPFILENAME$NOW.sql
```

Microsoft SQL Server

```
1   DECLARE db_cursor CURSOR READ_ONLY FOR
2   SELECT name
3   FROM master.dbo.sysdatabases
4   WHERE name NOT IN ('master','model','msdb','tempdb')
5
6   OPEN db_cursor
7   FETCH NEXT FROM db_cursor INTO @name
8
9   WHILE @@FETCH_STATUS = 0
10  BEGIN
11      SET @fileName = @path + @name + '_' + @fileDate + '.BAK'
12      BACKUP DATABASE @name TO DISK = @fileName
13      FETCH NEXT FROM db_cursor INTO @name
14  END
15
16  CLOSE db_cursor
17  DEALLOCATE db_cursor
```

Other Applications

- Gogs : ./gogs backup
- Gitea : ./gitea backup
- Gitlab : gitlab-rake gitlab:backup:create
- . . .

Files

```
1   /bin/rsync \
2     --no-motd \
3     --verbose \
4     --checksum \
5     --recursive \
6     --update \
7     --links \
8     --dirs \
9     --times \
10    --sparse \
11    --compress \
12    --compress-level=9 \
13    --progress \
14    --stats \
15    --numeric-ids \
16    --rsh=/bin/ssh \
17    --rsync-path=/usr/local/bin/rsync \
18    $SOURCEPATH \
19    {{ backup.server }}:$DESTINATIONPATH
```

3

Checking

There is no one solution

Create a new virtual environment

```
1  virsh net-define isolated.xml
2  virsh net-start isolated
3  virsh define server.xml
4  virsh start server.xml
5  virsh define client.xml
6  virsh start client
```

vtERP : invoicing program

PostgreSQL DB

```
1  SELECT  s.i  AS  missing  FROM  generate_series(1,$LASTINVOICE)  s(i)
     LEFT  OUTER  JOIN  sales2018.invoice_details  ON  (invoice_details.
     invoice_id=s.i)  WHERE  invoice_id  IS  NULL")
```

```
1  diff  -ruN  last.sql  new.sql
```

vtCommerce : eCommerce site

MariaDB Galera Cluster

```
1  CREATE DATABASE restoretest
2  USE restoretest
3  SOURCE $PATH/$FILENAME.sql
```

Shared Files

- Checksum verification
- Content checking
- Timestamp verification
- Human eyes (if all else fails)

Do not trust your end user

4

Conclusion

Conclusion

Automate and monitor your backup and restore process

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Configuration

Data
Dumping

Applications

Data

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Conclusion

The End

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