SnapVantage™
A Linux Cloning Tool

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Session 9270
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Agenda

• SnapShot
• Clone Creation
• Implementation
• Q&A
The SnapShot Advantage

• Iceberg Virtual Disk
  – IBM Ramac Virtual Array (RVA)
  – StorageTek Shared Virtual Array (SVA)
• SVAA SnapShot
  – Fast Disk Copy Utility
  – Functionally equivalent to DDR
  – Takes no additional disk storage
Minidisk Copy - 10,000 Cylinders

- Time (mins)
- TCPU (secs)
- I/Os (x10000)
- Disk MB (x100)

Graph showing performance metrics for DDR and SnapShot.
SnapVantage Overview

VM

SVAA ➔ SnapVantage VM Server (STKLCM) ➔ TCP/IP Stack ➔ SnapVantage Web Server ➔ Local Deployment Application

Model Linux Image-1 ➔ Model Linux Image-2 ➔ Cloned Linux Virtual Servers

Firewall ➔ Browser ➔ Browser ➔ Browser
SnapVantage Home Page

SnapVantage Version 1.01

- Clone Linux servers with SnapShot.
- Administer cloned Linux userids.
- VM Server log and configuration files.
- View SVA subsystems with SVAA.
- Monitor performance.
- Login to another VM Server.
Server Model Selection

- SuSE 7.2 Web
- SuSE 7.0 Web
- SuSE 7.2 Web
- RedHat 7.2 Development (no apache)
- TurboLinux 6.5
- SuSE 7.2 Web + /home
- SuSE Linux S/390 101
- SuSE Linux S/390 221 (advanced)
- SuSE Oracle Database
- SuSE Print Server
- SuSE DNS Server
- SuSE Development

1st available userid
Clone Options

Model Parameters for SUSE72

<table>
<thead>
<tr>
<th>Root Password</th>
<th>Server Name</th>
<th>IP</th>
<th>Peer</th>
<th>DNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>not4you</td>
<td>cthmx01</td>
<td>129.80</td>
<td>129.156</td>
<td>129.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>123.254</td>
<td>129.80.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New Root Password</th>
<th>Autolog Priority</th>
<th>Boot Device</th>
<th>Memory MB</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>sz37Y8cG</td>
<td>Medium</td>
<td></td>
<td></td>
<td>24/Feb/3053</td>
</tr>
</tbody>
</table>

Add Minidisk Definitions

<table>
<thead>
<tr>
<th>#</th>
<th>Request</th>
<th>Userid</th>
<th>Vdev</th>
<th>Pool</th>
<th>Mdisk</th>
<th>Size</th>
<th>Type</th>
<th>Description</th>
<th>Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SnapShot</td>
<td>DONJ</td>
<td>1200</td>
<td>DJPOOL</td>
<td>150</td>
<td>200</td>
<td>swap</td>
<td></td>
<td>delete</td>
</tr>
<tr>
<td>2</td>
<td>SnapShot</td>
<td>DONJ</td>
<td>1201</td>
<td>DJPOOL</td>
<td>151</td>
<td>3000</td>
<td>boot</td>
<td></td>
<td>delete</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>delete</td>
</tr>
</tbody>
</table>

Submit | Reset
Linux Boot Messages

SIBLCMBL -R(INIT) -V(1.01) -D(OFF) -SC() -PID(SnapVantage)
z/VM V4.2.0 2002-04-02 11:57
DMSACP723I A (191) R/O
DMSACP723I D (192) R/O
DMSACP723I E (194) R/O
Ready:
17:21:29 SIBLCMBL: Linux boot process for STKLNX02 on 16 Aug 2002
17:21:29 SIBLCMBL: CP LINK * 0150 0150 M
17:21:29 SIBLCMBL: CP LINK DONJ 1200 A3 1FFF RR
17:21:29 SIBLCMBL: SnapShot took 0.110 seconds to copy 200 cylinders
17:21:29 SIBLCMBL: CP LINK * 0151 0151 M
17:21:29 SIBLCMBL: CP LINK DONJ 1201 A3 1FFF RR
17:21:29 SIBLCMBL: SnapShot took 0.292 seconds to copy 3000 cylinders
17:21:29 SIBLCMBL: CP DEFINE CTCA OEBO USER TCPIP
17:21:29 SIBLCMBL: CP DEFINE CTCB OEBO USER TCPIP
17:21:29 SIBLCMBL: CP DEFINE TCPIP TCPP/IP 0F72
17:21:29 SIBLCMBL: CP DEFINE TCPIP TCPP/IP 0F73
17:21:29 SIBLCMBL: CP DEFINE TCPIP TCPP/IP 0F73
17:21:29 SIBLCMBL: CP QUERY VIRTUAL STORAGE
17:21:29 SIBLCMBL: CP QUERY VIRTUAL STORAGE
17:21:29 SIBLCMBL: CP IPL 151 CLEAR
hwc low level driver: can write messages
hwc low level driver: can not read state change notifications
hwc low level driver: can read commands
hwc low level driver: can read priority commands
Linux version 2.4.7-Suse-SMP (root@k_deflt.suse.de) (gcc version 2.95.3 20010315 (SuSE)) #1
We are running under VM
This machine has an IEEE 386 bus
On node 0 totalpages: 8192
zone(0): 8192 pages.
zone(1): 0 pages.
zone(2): 0 pages.
Zero to Server in 21 Seconds

Sending all processes the KILL signal...
  .done
INIT: Going single user
INIT: Sending processes the TERM signal
Give root password to login:

```
#/root/stk/chgident.sh stklnx01 stklnx02 129.80.129.156 129.80.129.152 129
<stklnx01 stklnx02 129.80.129.156 129.80.129.152 129>
<9.156 129.80.129.152 129.80.123.254 129.80.129.138
<0.123.254 129.80.129.138 129.80.5.148 129.80.16.241
Old Hostname  = stklnx01
New Hostname  = stklnx02
Old Host IP   = 129.80.129.156
New Host IP   = 129.80.129.152
Old Peer IP   = 129.80.123.254
New Peer IP   = 129.80.129.138
Old DNS IP    = 129.80.5.148
New DNS IP    = 129.80.16.241
Distribution = suse
SED CMD      = /bin/sed -e \'/129.80.129.156/129.80.129.152/g' -e \'/stklnx01/stklnx02/g' -e 'passwd'

Password:
New password:
Re-enter new password:
Password changed
```

STKLNX02 initialized with IP address 129.80.129.152 and root password sz37Y8rG
SUSE72 clone operation completed in 21 seconds
Linux Models

- Supported Distributions
  - Redhat 7.2
  - SuSE 7.0 and 7.2
  - TurboLinux 6.5

- Clone Minidisk Storage
  - Determine R/O vs. R/W strategy
  - Static allocation
  - Dynamic allocation via storage pools
    - DIRMAINT, VM:DIRECT, VM:SECURE
Model Installation and Customization

• Define backup minidisks
  • Mdisk 100 – development, customization
  • Mdisk 200 – clone image
  • Mdisk 300 – clone backup

• Install and Customize Linux on Mdisk 100
  – SnapShot backup 100 to 300 throughout
    • SIBVMRVA SNAP 100 300
  – Copy SnapVantage script directory to /root
  – Set the default runlevel to 1
  – Shutdown Linux
  – SnapShot 100 to 200
## Linux Server Models

<table>
<thead>
<tr>
<th>Server Name</th>
<th>Option Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUSE70</td>
<td>SuSE 7.0 Web</td>
</tr>
<tr>
<td>SUSE72</td>
<td>SuSE 7.2 Web</td>
</tr>
<tr>
<td>REDHAT72</td>
<td>RedHat 7.2 Development (no apache)</td>
</tr>
<tr>
<td>SUSEWEB1</td>
<td>SuSE Web + /home</td>
</tr>
<tr>
<td>SUSE101</td>
<td>SuSE Linux S/390 101</td>
</tr>
<tr>
<td>SUSE221</td>
<td>SuSE Linux S/390 221 (advanced)</td>
</tr>
<tr>
<td>SUSEDDB1</td>
<td>SuSE Oracle Database</td>
</tr>
<tr>
<td>SUSEPS1</td>
<td>SuSE Print Server</td>
</tr>
<tr>
<td>SUSEDNS1</td>
<td>SuSE DNS Server</td>
</tr>
</tbody>
</table>
Model Template File

- Model IP, DNS addresses, root password
- Boot address
- Virtual storage
- New root password
- Expiration date
- Autolog priority
- Minidisk definitions
* Linux device definitions.

* Action codes: S - SnapShot
  I - Instant Format
  T - TDISK (dynamically defined)
  V - VDISK (dynamically defined)
  D - DDR
  F - Format (CMS Format using SIBFMTSS)
  U - User defined (no action taken)

* Model: Storage: Linux Server
  Action: Userid: Vdev: Pool: Mdisk: Size: Type: Description

-LDD(
  V: : : 150 : 250000 : swap ;
)
### Clone Web Page

**Model Parameters for SUSEWEB1**

<table>
<thead>
<tr>
<th>Root Password</th>
<th>Server Name</th>
<th>IP</th>
<th>Peer</th>
<th>DNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>not4you</td>
<td>ctlhzt01</td>
<td>129.80.129.156</td>
<td>129.80.123.254</td>
<td>129.80.5.148</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New Root Password</th>
<th>Autolog Priority</th>
<th>Boot Device</th>
<th>Memory</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMrules</td>
<td>High</td>
<td>151</td>
<td>Default</td>
<td>24/Feb/3053</td>
</tr>
</tbody>
</table>

**Add Minidisk Definitions**

<table>
<thead>
<tr>
<th>#</th>
<th>Request</th>
<th>Model</th>
<th>Storage</th>
<th>Linux Server</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vdisk</td>
<td></td>
<td></td>
<td></td>
<td>swap</td>
</tr>
<tr>
<td>2</td>
<td>SnapShot</td>
<td>DONJ</td>
<td>DJPOOL</td>
<td></td>
<td>boot</td>
</tr>
<tr>
<td>3</td>
<td>Instant Format</td>
<td></td>
<td>DJPOOL</td>
<td></td>
<td>/home -c</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Buttons:**
- Submit
- Reset
Under the Hood

- Clone Requests from Web or CLI
- SnapVantage VM Server processes the requests
  - Uses CMS Multitasking Services
  - Allocates resources and autologs the Linux Clone
  - Secondary Console Facility
- Linux Clone
  - Performs minidisk initialization tasks
  - Boot Linux
  - Customize via commands sent from VM Server
That’s only the tip of the Iceberg…

• Cloning is only the 1\textsuperscript{st} step
  – Manage the Farm
    • Autolog the Linux servers at VM IPL
    • Shutdown the servers (en masse or individually)
    • Monitor their activity
    • Send Linux commands to one or more servers
• Use multiple SnapVantage VM servers
  – Linux Model development
  – One or more for Linux farms
• Use SnapShot
Contacts and Additional Information

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SnapVantage product information
http://www.storagetek.com/prodserv/products/software/svan/