

LinuxONE DPM3.1+TS3500实施手册

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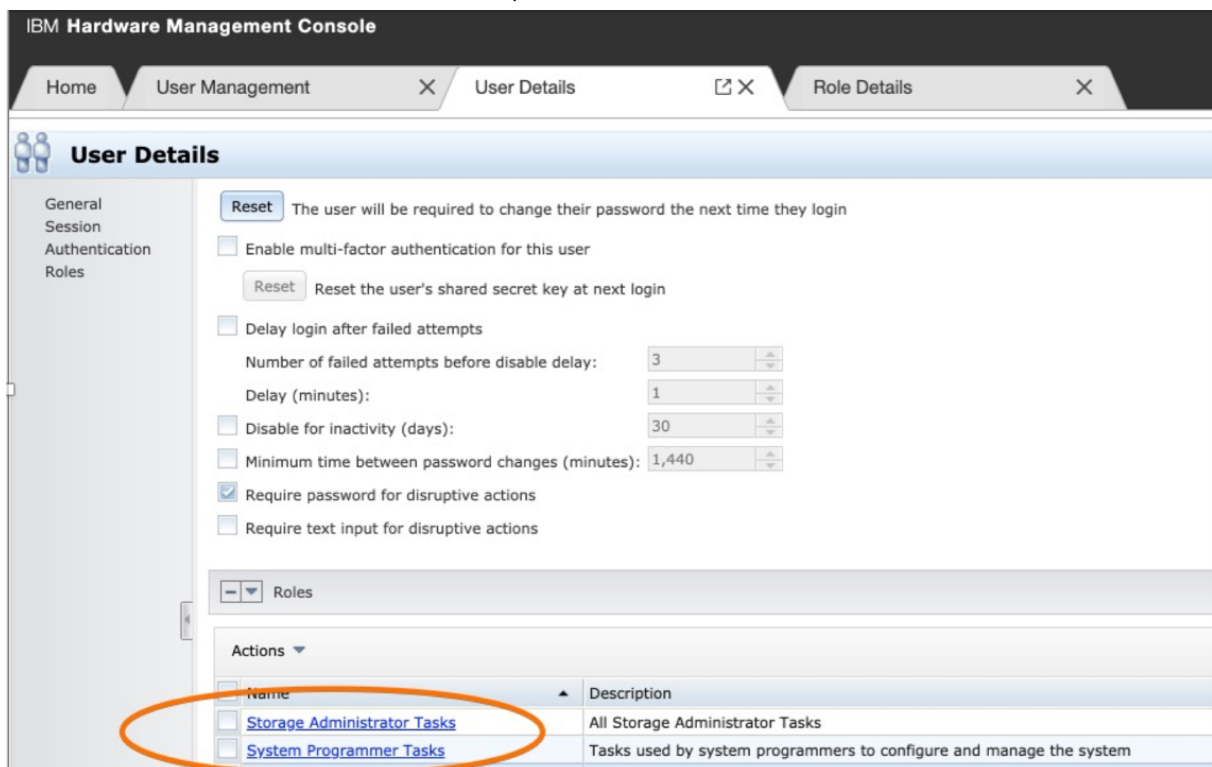
环境准备

- 操作系统
Suse12 Sp4
- 带库
IBM System Storage TS3500 Tape Library, LTO Ultrium-6

DMP3.1默认没有实现对带库设备的识别.需要在HMC里进行手工的配置并执行一段python代码来正确识别带库设备. 请参照接下来的内容进行操作.

HMC操作

- 创建HMC账号
登录 acsadmin, 增加一个新的账号,如tapeuser,带有如下权限:



为新用户增加权限:

- Configure Storage - Storage Administrator
- Configure Storage - System Programmer 的权限
- 为新用户(tapeuser)增加remote api权限

HMC2: Customize API Settings

SNMP

WEB Services

☒ Enable

IP Address Access Control

☒ Allow all IP Addresses
☐ IP Addresses

IBM Hardware Management Console

Home

Customize API Settings

✕

<input type="checkbox"/>	ZhaoLuo	User	1000
<input checked="" type="checkbox"/>	service	User	100
<input checked="" type="checkbox"/>	tapeuser	User	100
<input type="checkbox"/>	toperator	User	1000
<input type="checkbox"/>	training01	User	100
<input checked="" type="checkbox"/>	zBrand	User	1000
<input type="checkbox"/>	zbrand2	User	100

- 创建一个Storage Group, 并添加一块任意大小的boot盘.
- 将Storage Group分配给LPAR

编辑Python脚本

在附件里可以找到一个名为 attach_tape.py 的脚本.

脚本需要修改的地方:

```
# 设定HMC的IP地址
hmc_address = "172.16.31.232"
# 设定账号
hmc_userid = "tapeuser"
# 设定密码
hmc_password = "password"
# 设定CPC名字
cpc_name = 'BZ13'
# 设定Storage Group的UUID,具体UUID获取方式请参考后面截图
```

```
storage_group_uuid_customer = "38382ee2-b85d-11e9-81f0-00106f23eea9"
```

```
# 设定HBA卡的UUID,具体UUID获取方式请参考后面截图。这里是一个数组
```


```
# 具体数量以HBA数量为准
```

```
adapter_port_list = ['1A424A76-9C8D-11E9-A962-00106F23EEA9',  
                    '18F97270-9C8D-11E9-A962-00106F23EEA9',]
```

通过如下方式获取Storage Group的UUID:

Type of storage FCP	Total capacity 1 GiB	Volumes 1	Shareability Shared with 0 of max. 1 partition
Fulfillment state Pending	Connectivity 2 paths	Storage group ID (UUID) 461377a4-ffb3-11e9-9660-00106f23b391	

通过如下方式获取HBA卡的UUID:

 **Adapter Details - FCP 0161 Z22B-30**

General

Connections

General

Name:FCP 0161 Z22B-30

Description:

Object ID:
System:D3A47186-EB04-11E9-847C-00106F23B391
BZ12

Status:Active
Detailed status:Operating
State:Online

HBA allocation:3.1%

运行脚本

在python环境下,执行 attach_tape.py

执行成功后,可以在storage group里看到HBA已经正确识别.

如果执行成功,注意不要再次重复执行该脚本.

以下样例使用的是两块HBA卡的识别情况.

VOLUMES

PARTITIONS

ADAPTERS

WWPNs

HISTORY

Adapters

NAME	FABRIC ID	ADAPTER ID	TYPE	LOCATION	ALLOCATION
FCP 0124 A14B-13	10000027F84D5F6A	0124	FCP	A14B-D113-J.01	<div><div></div></div> 26.6 %
FCP 0104 A14B-03	10000005336C8A43	0104	FCP	A14B-D103-J.01	<div><div></div></div> 25 %

Total: 2 adapters

接下来介绍连接IBM带库需要用到哪些软件, 以及下载方式.

连接IBM带库设备的Linux on Z需要安装的驱动及工具

- lin_tape

lin_tape功能

- 带库驱动
- Basic operation to tape (save / restore)
- Tape media exchange operation (mount / unmount)

- in_taped (error diagnostic daemon)

lin_taped功能

- Error log and trace
- Automatic writing of tape drive dumps, log data, etc.
- Failover and Load Balancing
- 加密

- ITDT(IBM Tape Diagnostic Tool)

ITDT功能

- Recognize supported tape drives and tape libraries
- Tape drive diagnostics
- Dump from tape drive and tape library
- Performance measurement
- Acquisition of cartridge usage status

lin_tape 驱动下载

- 从Fix Central下载驱动

<http://www.ibm.com/support/fixcentral/>

下载下面两个文件(建议下载最新版):

- lin_tape-x.xx.x-x.src.rpm (lin_tape驱动)
- lin_taped-x.xx.x-sles11.s390x.rpm (lin_taped daemon)

请注意下载for s390x的

- 下载方法步骤
 - Product Selector: System Storage
 - System Storage: Tape Systems
 - Tape Systems : Tape drivers and software
 - Tape drivers and software: Tape device drivers
 - Platform: Linux, 64-bit zSeries
- 选择对应操作系统版本,比如sles12,下载:
- lin_tape-x.xx.x-x.src.rpm
 - lin_taped-x.xx.x-sles11.s390x.rpm
 - ITDT工具可以一起下载下来
 - install_itdt_se_Linuxs390x_xxx

lin_tape 驱动编译说明

lin_tape 驱动是以source rpm的方式提供，需要针对安装环境build以后方可安装，进行rpmbuild的环境需要满足：

- 同样的操作系统，同样的内核版本
- 安装同样版本的kernel-devel, kernel-default-devel包
- 使用下面命令build rpm包：
 - rpmbuild --rebuild lin_tape-3.0.39-1.src.rpm
 - 完成的rpm包位于usrsrcpackagesRPMS/s390x
 - Build出来的rpm包可用于相同操作系统相同内核版本的lin_tape驱动安装

Tape 驱动和工具安装步骤

Tape 驱动和工具安装步骤(1)

lin_tape安装前准备

```
# cp -p /etc/modprobe.d/10-unsupported-modules.conf /etc/modprobe.d/10-
unsupported-modules.conf.bk
# vi /etc/modprobe.d/10-unsupported-modules.conf
# cat /etc/modprobe.d/10-unsupported-modules.conf
...
allow_unsupported_modules 1
```

allow_unsupported_modules设置为1

缺省值为0，表示只有包含在安装DVD中的kernel module才能load，改为1，则其它module可以load。

Tape 驱动和工具安装步骤(2)

```
lin_tape驱动rebuild
# rpmbuild --rebuild lin_tape-3.0.39-1.src.rpm

lin_tape驱动安装
# rpm -ivh /usr/src/packages/RPMS/s390x/lin_tape-3.0.39-1.s390x.rpm
Preparing... ##### [100%]
 1:lin_tape ##### [100%]
Starting lin_tape: FATAL: module '/lib/modules/4.4.140-94.42-default/kernel/
drivers/scsi/lin_tape.ko' is unsupported
Use --allow-unsupported or set allow_unsupported_modules to 1 in
/etc/modprobe.d/unsupported-modules
lin_tape loaded
```

Tape驱动和工具安装步骤(3)

lin_taped daemon安装

```
lin_taped 安装
# rpm -ivh lin_taped-3.0.39-sles12.s390x.rpm
Preparing... ##### [100%]
 1:lin_taped ##### [100%]
Starting lin_tape: FATAL: module '/lib/modules/4.4.140-94.42-default/kernel/
drivers/scsi/lin_tape.ko' is unsupported
Use --allow-unsupported or set allow_unsupported_modules to 1 in
/etc/modprobe.d/unsupported-modules
lin_tape loaded
```

检查安装结果

```
# rpm -qa |grep lin_tape
lin_tape-3.0.39-1
lin_taped-3.0.39-1
# lsmod|grep lin_tape
Module                Size  Used by
lin_tape               487424  2
<省略>
# modprobe --allow-unsupported lin_tape （如果需要手工load）
```

带库设备在操作系统内的识别过程

带库设备操作系统识别过程 (1)

1. FCP设备识别

```
# lscss -t 1732
Device    Subchan.  DevType CU Type Use  PIM PAM POM  CHPIDs
-----
0.0.c8c3 0.0.377b  1732/03 1731/03      80  80  ff  b6000000 00000000
0.0.c8c4 0.0.377c  1732/03 1731/03      80  80  ff  b6000000 00000000

# zfcplib_host_configure 0.0.c8c3 1

# zfcplib_host_configure 0.0.c8c4 1

# lscss -t 1732
Device    Subchan.  DevType CU Type Use  PIM PAM POM  CHPIDs
-----
0.0.c8c3 0.0.377b  1732/03 1731/03 yes  80  80  ff  b6000000 00000000
0.0.c8c4 0.0.377c  1732/03 1731/03 yes  80  80  ff  b6000000 00000000

*如果是动态加入FCP设备，lscss没有列出，应先执行cio_ignore命令
# cio_ignore -r 0.0.c8c3,0.0.c8c4
```

2. 配置带库zfcplib设备 （SLES11，如果有多条path到带库设备，需要逐一定义）

```
# zfcplib_configure 0.0.c8c3 0x500507630f5bc803 0x0000000000000000 1
```

```
# zfcplib_configure 0.0.c8c4 0x500507630f5bc803 0x0001000000000000 1
```

3. 确认带库设备正确识别

```
# cat /proc/scsi/IBMtape
```

```
lin_tape version: 1.73.0
```

```
lin_tape major number: 253
```

Attached Tape Devices:

Number	model	SN	HBA	SCSI	F0 Path
0	ULT3580-TD3	1210006061	zfcplib	2:0:2:0	NA

```
# cat /proc/scsi/IBMchanger
```

```
lin_tape version: 1.73.0
```

```
lin_tape major number: 253
```

Attached Changer Devices:

Number	model	SN	HBA	SCSI	F0 Path
0	03584L32	0000000189710411	zfcplib		NA

• 以上第2步骤适用SLES11, SLES12会自动配置zfcplib设备。

4. /etc/udev/rules.d/ 确认下面相关文件生成

```
# ls /etc/udev/rules.d/ |grep -E "(c8c3|c8c4)"
```

```
51-zfcplib-0.0.c8c3.rules
```

```
51-zfcplib-0.0.c8c4.rules
```

5. 确认文件内容 (sles11,12有区别)

```
# cat /etc/udev/rules.d/51-zfcplib-0.0.c8c3.rules
```

```
# Configure zFCP device at 0.0.c8c3
```

```
ACTION=="add", SUBSYSTEM=="ccw", KERNEL=="0.0.c8c3", IMPORT{program}="collect  
0.0.c8c3 %k 0.0.c8c3 zfcplib"
```

```
ACTION=="add", SUBSYSTEM=="drivers", KERNEL=="zfcplib", IMPORT{program}="collect  
0.0.c8c3 %k 0.0.c8c3 zfcplib"
```

```
ACTION=="add", ENV{COLLECT_0.0.c8c3}=="0", ATTR{[ccw/0.0.c8c3]online}=="1"
```

```
ACTION=="add", KERNEL=="rport-*", ATTR{port_name}=="0x500507630f5bc803",  
SUBSYSTEMS=="ccw", KERNELS=="0.0.c8c3", ATTR{[ccw/0.0.c8c3]0x500507630f5bc803/  
unit_add}=="0x0000000000000000"
```

```
# cat /etc/udev/rules.d/51-zfcplib-0.0.c8c4.rules
```



```
# Configure zFCP device at 0.0.c8c4
ACTION=="add", SUBSYSTEM=="ccw", KERNEL=="0.0.c8c4", IMPORT{program}="collect
0.0.c8c4 %k 0.0.c8c4 zfc"
ACTION=="add", SUBSYSTEM=="drivers", KERNEL=="zfc", IMPORT{program}="collect
0.0.c8c4 %k 0.0.c8c4 zfc"
ACTION=="add", ENV{COLLECT_0.0.c8c4}=="0", ATTR{[ccw/0.0.c8c4]online}="1"
ACTION=="add", KERNEL=="rport-*", ATTR{port_name}=="0x500507630f5bc803",
SUBSYSTEMS=="ccw", KERNELS=="0.0.c8c4", ATTR{[ccw/0.0.c8c4]0x500507630f5bc803/
unit_add}="0x0001000000000000"
```

6. 确认设备 (IBMtape, IBMchanger)

```
# ls -l /dev/IBM*
```

ITDT是带库设备诊断工具

接下来介绍如何安装ITDT

ITDT安装

IBM Tape Diagnostic Tool安装

```
# chmod +x install_itdt_se_Linuxs390x_9.3.0.20181029

# ./install_itdt_se_Linuxs390x_9.3.0.20181029

# ./itdt
Please wait for startup completion.... (Q to quit)
(以下省略)

IBM Tape Diagnostic Tool Standard Edition – Version: 6.1.0.055

Entry Menu

[S] Scan for tape drives (Diagnostic/Maintenance Mode)
[U] Tapeutil (Expert Mode)

[H] Help
[Q] Quit program
```

(以下省略)

因为故障或维修,比如光纤线断开或更换驱动器等操作,可能会导致带库无法正常恢复. 通过设置TMO来避免该问题. 因此, 要求必须设置TMO.

设置TMO的方法

增加rules:

```
vi /etc/udev/rules.d/52-rport-tmos.rules
```

添加如下内容:

```
ACTION=="add", KERNEL=="rport-*", ATTR{fast_io_fail_tmo}=="?*",  
ATTR{fast_io_fail_tmo}="5" ACTION=="add", KERNEL=="rport-*", ATTR{dev_loss_tmo}  
=="?*", ATTR{dev_loss_tmo}="2147483647"
```

执行如下命令生效:

```
# udevadm trigger --subsystem-match=fc_remote_ports --action=add
```

确认修改成功:

```
# lszfcp -Pa | grep tmo
```