



# File system manager

Single tool to manage your storage

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# Part I

## **Background**

# Agenda

- 1 Single disk storage
- 2 Device mapper
- 3 Linux software RAID - MD
- 4 Btrfs

# Agenda

**1** Single disk storage

2 Device mapper

3 Linux software RAID - MD

4 Btrfs

# Single disk storage

- Very limited possibilities (partitioning)
- Filesystem:
  - mkfs.\* fsck.\*
  - Different resize utilities
  - Different ways to get basic information

# Agenda

- 1 Single disk storage
- 2 **Device mapper**
- 3 Linux software RAID - MD
- 4 Btrfs

# Logical volume management

- Great set of tools - flexible, provides endless options
- Can be used with any file system
- A bit overcomplicated user interface:
  - 42 tools to work with
  - Even the most basic operation takes at least 3 steps/tools
  - Too many levels of abstraction for regular user
  - Physical volume, Volume group, Logical volume



# Agenda

- 1 Single disk storage
- 2 Device mapper
- 3 **Linux software RAID - MD**
- 4 Btrfs

# Linux software RAID - MD

- Yet another tool to manage your storage
- Hopefully soon integrated into lvm tools
  - Extending lvm tools portfolio

# Agenda

- 1 Single disk storage
- 2 Device mapper
- 3 Linux software RAID - MD
- 4 **Btrfs**

## Btrfs - FS with integrated volume management

- Again, yet another tool to manage your storage
- Relatively easy to use user interface
- At least it involves file system as well
- Promising new file system with new set of features:
  - Some features can be delivered with DM/MD + other FS

## Storage increasingly more complex

- Storage stack is growing
- Complexity leads to higher cost, more faults
- Lots of similar features provided by different technologies
  - More features brings more possible combinations
- Lot of this can be hidden behind the single tool
  - The most common tasks can be automatized
  - User interface can be simplified
  - Lots of information from different sources in one place
  - Not everything can be done - why and how



Part II

## **File system manager**

# Agenda

5 FSADM vs. FSM

6 What it is supposed to do ?

7 Examples

8 Current status

# Agenda

5 **FSADM vs. FSM**

6 What it is supposed to do ?

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## FSADM vs. FSM

- FSADM is bash script used by lvm tools
  - Check and resize file system
  - Was not supposed to be generic tool
- FSM - **File System Manager**
  - Written in python
  - Is supposed to be generic tool
  - Should not be lvm-centric

# Agenda

5 FSADM vs. FSM

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## Saving the world (not really!)

- Provide easy-to-use interface for common storage management tasks
  - Creating new file systems (with all the stack bellow)
  - Resizing the file systems
  - Mirrors, Snapshots, RAID's
  - Provide information
- Give user an advice
- We should pick the most safe and sane operation as the default
- More features brings more possible combinations
  - We can easily bail out when undecided what to do
  - We do **not** need to save the world

# Agenda

5 FSADM vs. FSM

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7 **Examples**

8 Current status

## Listing information

- Single command to list all important information
- `fsm list [{volumes,devices,pool,filesystems}]`

```
# fsm list devices
```

Device	Free	Used	Total	Pool	Mount point
/dev/sda2		78.12 GiB			
/dev/sda3		1.95 GiB			
/dev/sda4		1.00 KiB			
/dev/sda		149.05 GiB			PARTITIONED
/dev/sda1		19.53 GiB			/
/dev/sda5	49.44 GiB	0.00 KiB	49.44 GiB	neco	

## Listing information

- Single command to list all important information
- `fsm list [{volumes,devices,pool,filesystems}]`

```
# fsm list volumes
```

Volume	Volume size	FS	Free	Used	FS size	Type	Mount point
/dev/sda1	19.53 GiB	ext4	5.37 GiB	13.18 GiB	19.53 GiB		/

## Listing information

- Single command to list all important information
- `fsm list [{volumes,devices,pool,filesystems}]`
- Information gathered by at least 5 different tools
- Opportunity to extend the command
  - Listing by specified criteria (fs type, size etc...)
  - Listing more detailed information about volumes, disks ...

## Create volume with file system

- Single command to create volume

```
fsm create [-h] [-s SIZE] [-I STRIPESIZE] [-n NAME]  
           [--fstype FSTYPE] [-i STRIPES] [-p POOL]  
           [device [device ...]]
```

```
# fsm create --fs ext4 --size 1T /dev/sda /dev/sdb
```

- User does not have to care about volume groups
- The example substitutes (pvcreate), vgcreate, lvcreate, mkfs.ext4



## Resize volume with file system

- Single tool to resize the volume

```
fsm resize [-h] [-s SIZE] volume [device [device ...]]
```

```
# fsm resize vg001/lvol1 -s +1T /dev/sda /dev/sdb
```

- User does not have to care about volume groups
- The example substitutes (vgreduce), vgextend, lvresize, resize2fs

## We can do a lot more

- More commands to use more storage features
  - list, create, resize
  - remove
  - add
  - snapshot
  - check
  - mirror
- Btrfs support should be added
- Linux Software RAID support should be added
- More file systems, clustered file systems
- LUNs, multipath storage etc..

# Agenda

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8 **Current status**

## Current status

- Pre-alpha state
- Cleaning up user interface
- Finishing basic commands and features
  - list, create, remove, add, check = ready
  - resize, mirror, snapshot = next step
- No public repository yet :(



# The end.

Thanks for listening.