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ZFS - Perfect Filesystem for Containers

Damian Wojsław
Technical Support Engineer, Canonical

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Zettabyte Filesystem

Copy-on-write filesystem for Sun Solaris, now Oracle Solaris
OpenZFS - the implementation in illumos, *BSD, Linux

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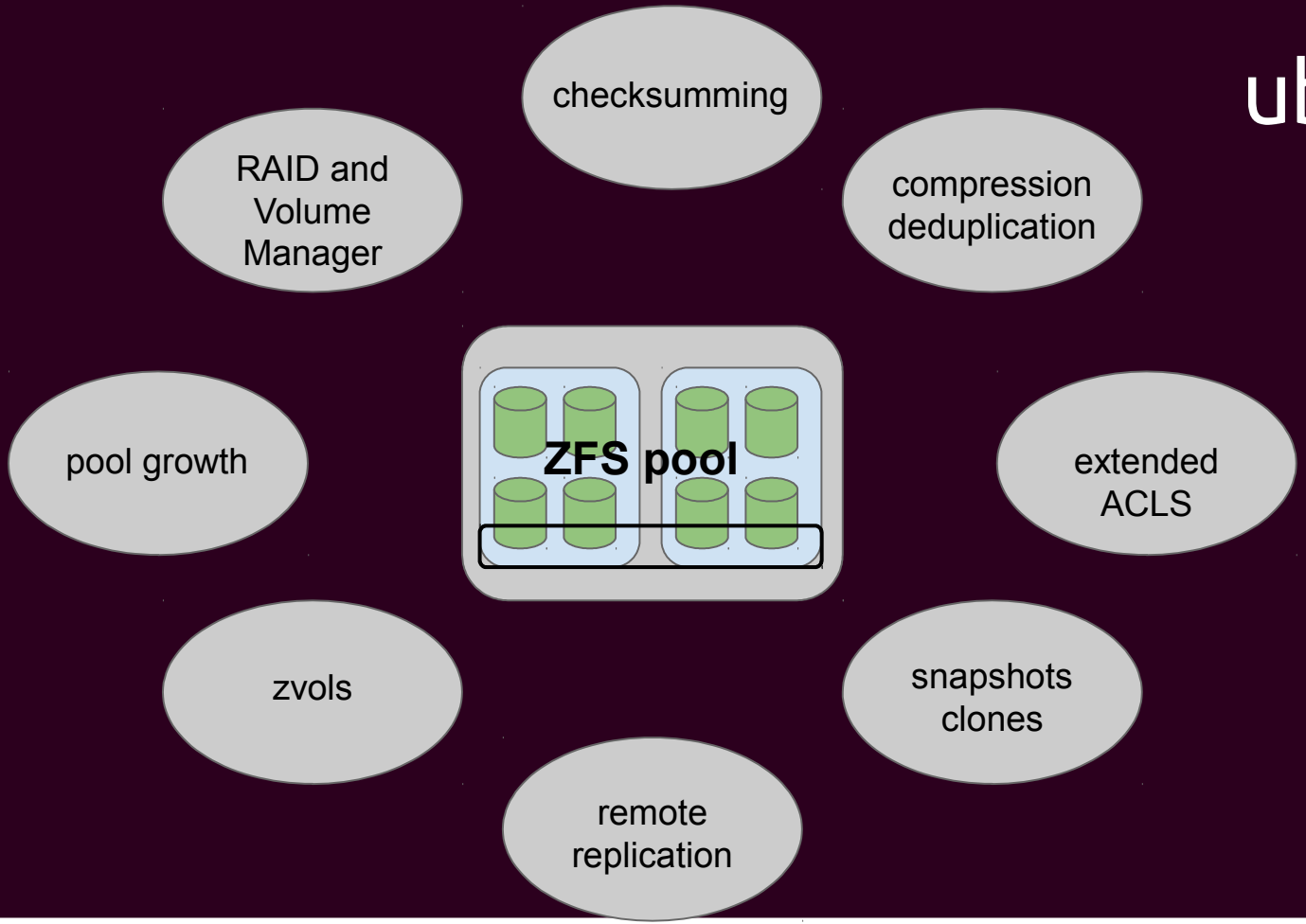

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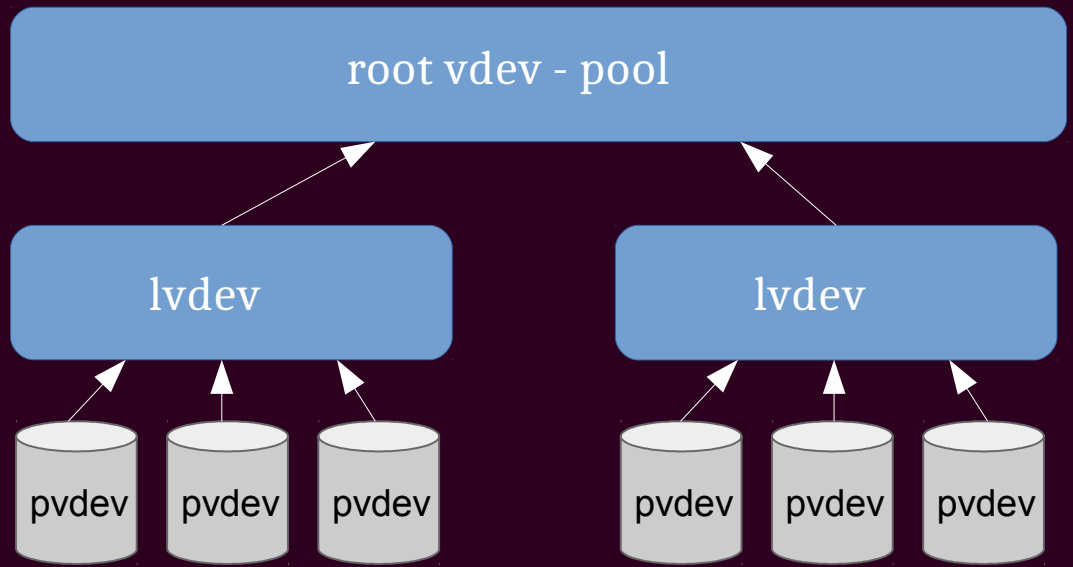
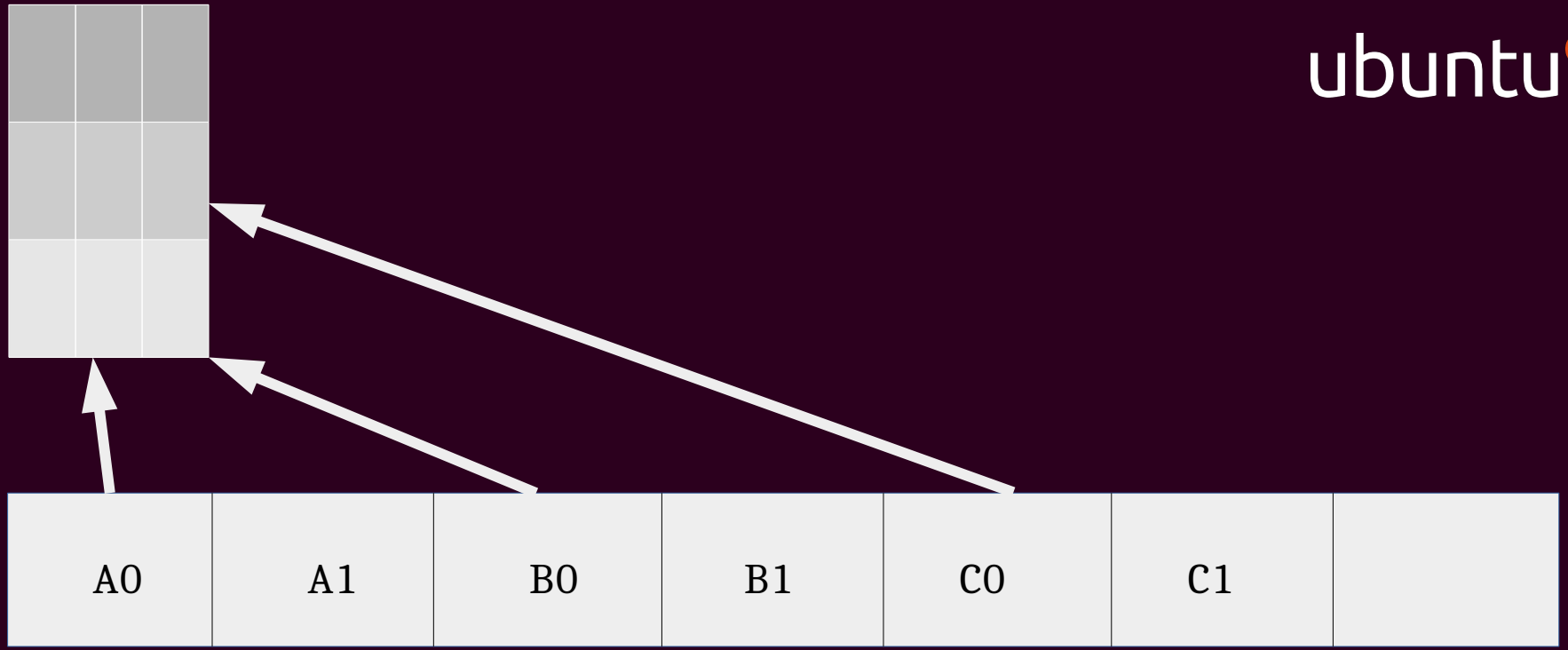
A what, what, what? A short dictionary





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```
NAME                        USED  AVAIL    REFER  MOUNTPOINT
data                        406K   108G19K          none
rpool                      47.3G   383G96K          /
rpool/ROOT                 3.53G   383G96K          none
rpool/ROOT/ubuntu          3.53G   383G     3.39G   /
rpool/home                 26.5G   383G96K          /home
rpool/home/root             216K   383G      216K   /root
rpool/home/trochej         26.5G   383G     22.8G   /home/trochej
rpool/home/trochej/Music   1015M   383G     1015M   /home/trochej/Music
rpool/home/trochej/Videos  2.70G   383G     2.70G   /home/trochej/Videos
rpool/swap                 17.0G   400G     12.5M   -
rpool/var                   191M   383G       96K   /var
rpool/var/cache             150M   383G      150M   legacy
rpool/var/log              40.5M   383G     40.5M   legacy
rpool/var/spool             116K   383G      116K   legacy
rpool/var/tmp               168K   383G      168K   legacy
```

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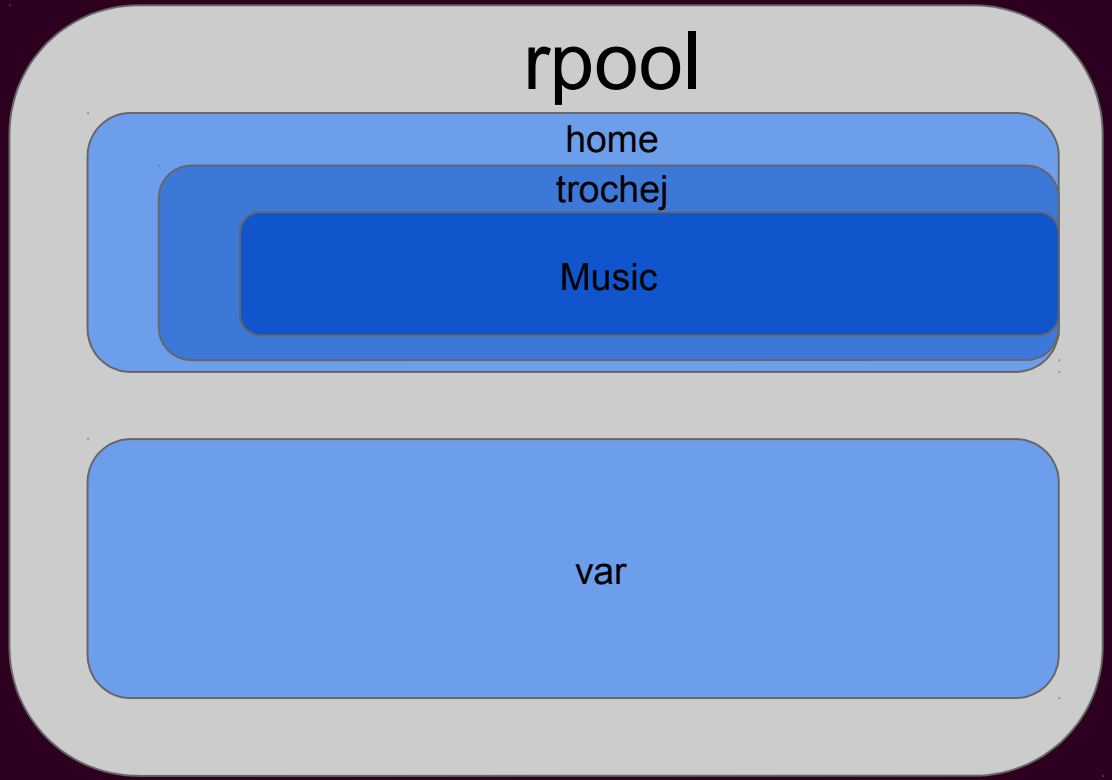


```
rpool/home/trochej/Music

var
```

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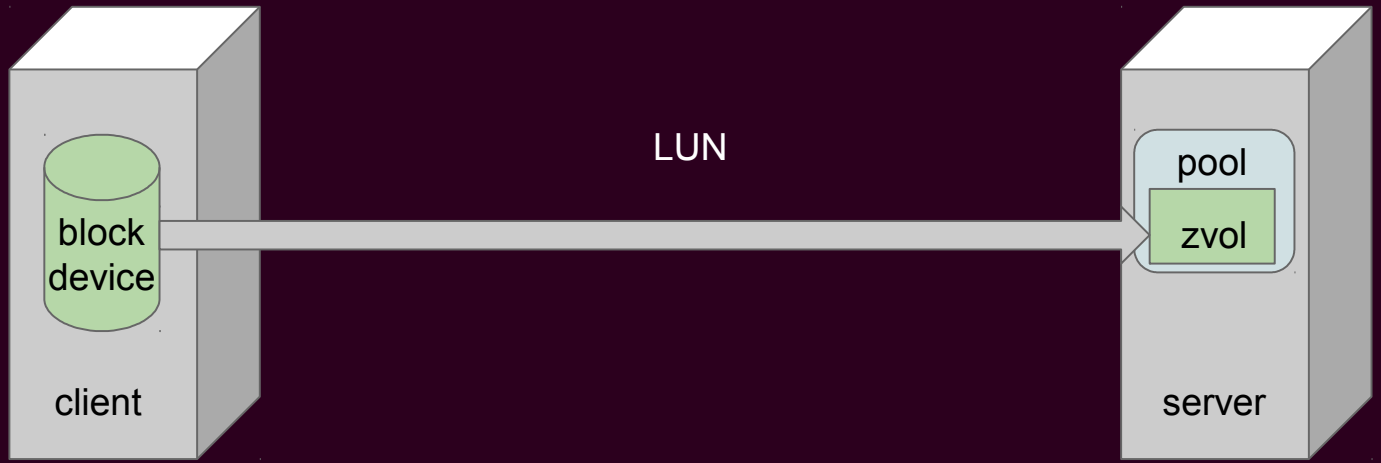

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Space allocation works differently that in traditional filesystems and volume managers.

Filesystems are free to allocate blocks from the whole pool - no preallocated filesystem space.

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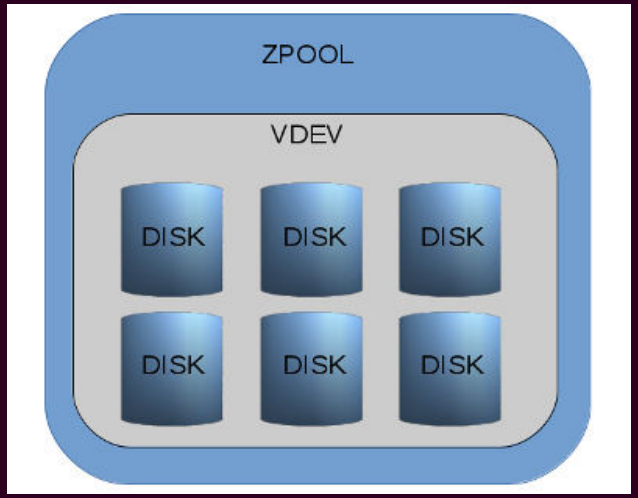
Common pool layouts - RAIDZ, RAIDZ-2

One vdev



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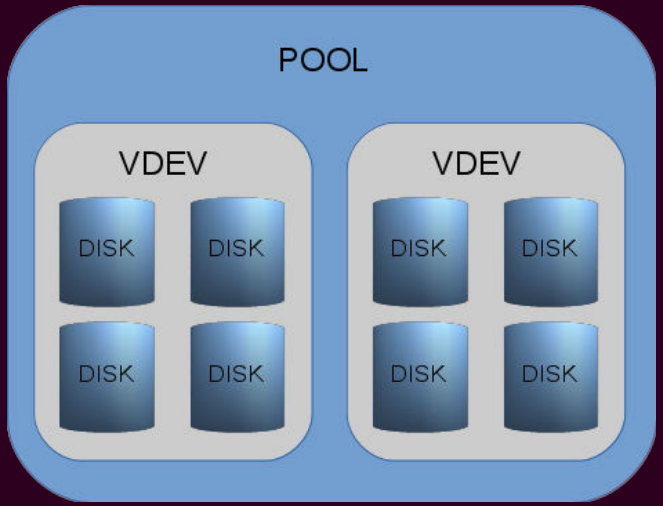
Common pool layouts - RAIDZ, RAIDZ-2

Multiple vdevs



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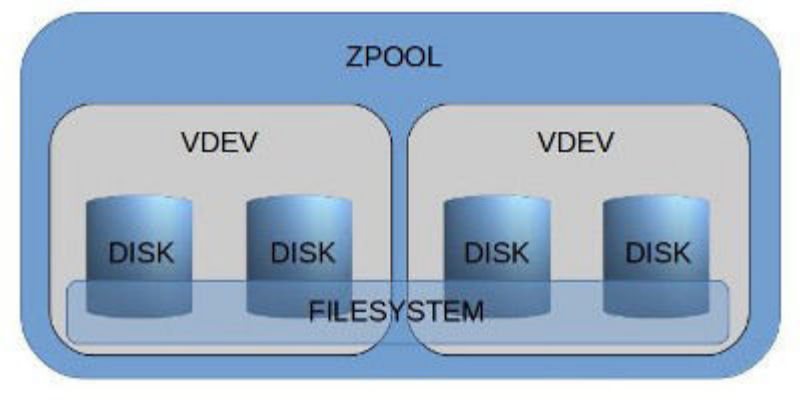
Common pool layouts - mirror

Multiple vdevs



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Here be dragons

- Space utilization reporting: zfs -o space,
- Pool health
- Deduplication

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ZFS as root filesystem

1. Cheap and quick clones of running system for experimentation
2. As above, but for preparing a backup
3. “Golden image” copy of system

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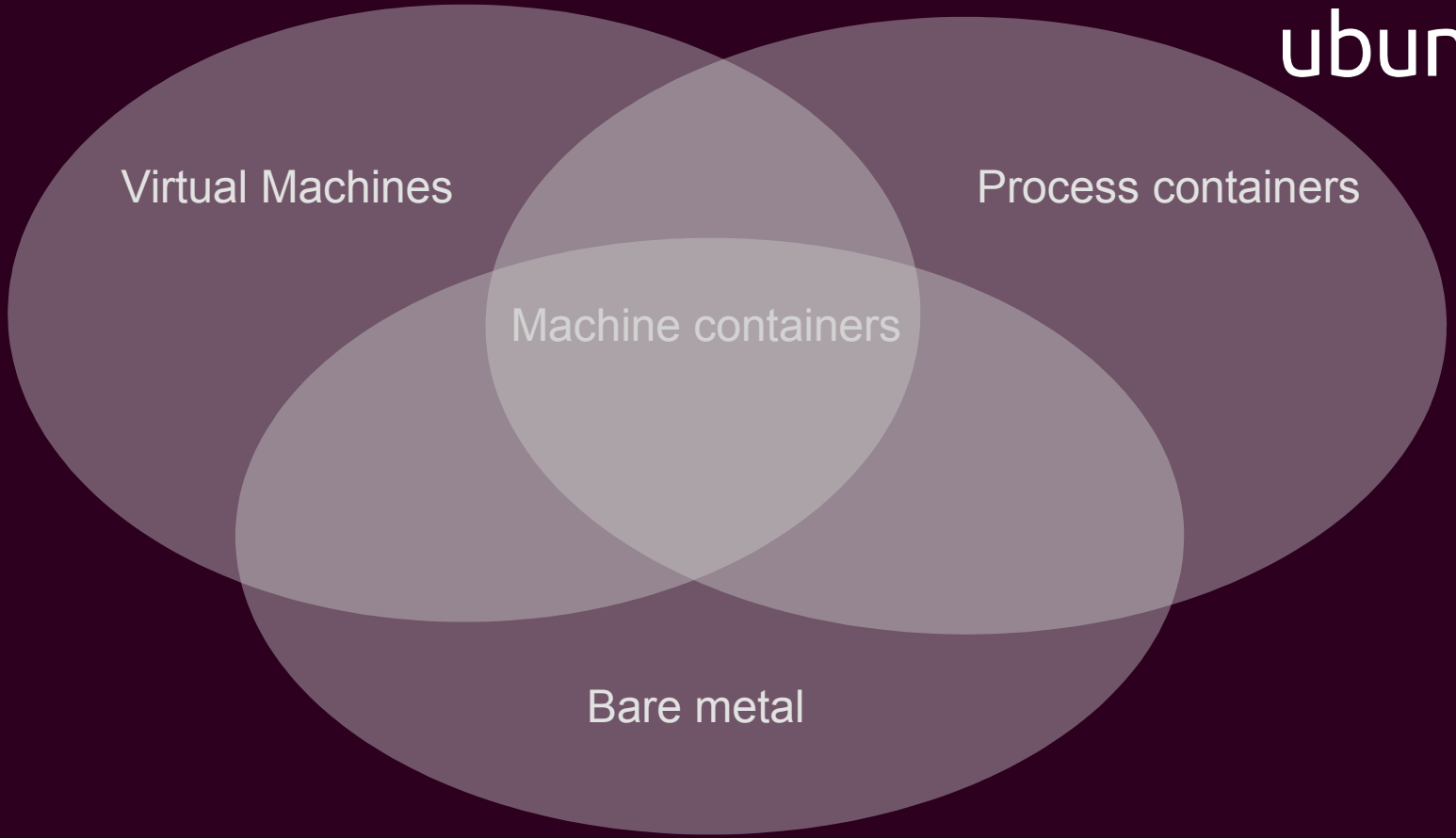
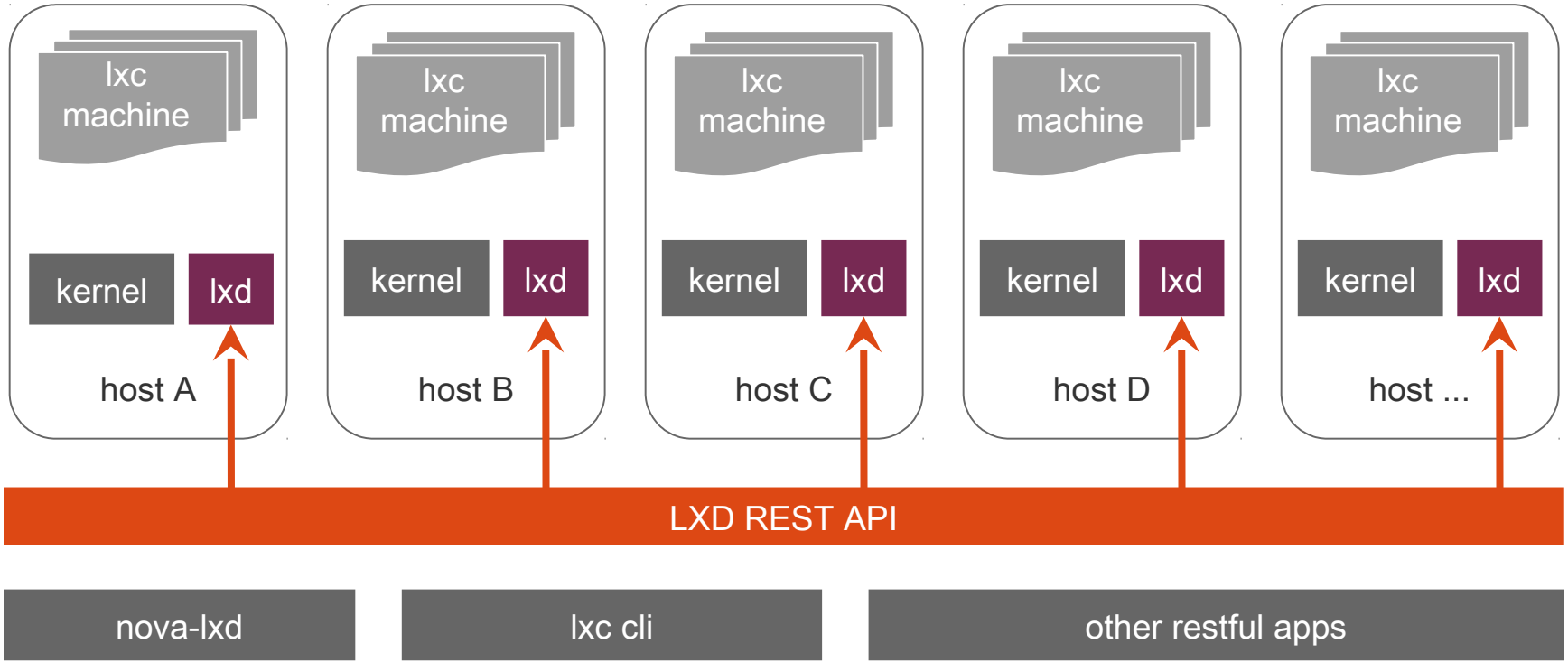

Virtual Machines
Process containers
Machine containers
Bare metal

LXD is Canonical's container hypervisor



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LXD and ZFS

1. ZFS as a storage backend to LXD
2. Snapshot, restore
3. Compression on the fly
4. Deduplication (don’t forget to monitor closely)
5. Simplified backup

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Demo

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References

http://open-zfs.org/
http://github.com/openzfs
http://github.com/zfsonlinux
http://linuxcontainers.org/
http://ubuntu.com/lxd
http://github.com/lxc
Freenode: #openzfs, #ubuntu, #zfsonlinux, #lxcontainers

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