napp-it Zones User's Guide

Setup on OmniOS

published: 2016, Okt 12 (c) napp-it.org

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The OmniOS LX Zones (Linux container) integration from SmartOS is in beta state It is expected as stable in next OmniOS LTS 151022 (around March/April 2017)

This manual includes some first conceptional ideas about distributing preconfigured zones not only the containers within. These ideas may change.

# 1. Zones

OmniOS supports Solaris and Linux (LX) branded zones included to Illumos by Joyent/ SmartOS more, see and smile:

#### https://omnios.omniti.com/wiki.php/LXZones

https://www.youtube.com/watch?v=TrfD3pC0VSs&list=PLH8r-Scm3-2VmZhZ76tFPAhPOG0pvmjdA&index=6 https://www.infoq.com/news/2016/03/containers-summit-nyc

### 2. LX branded zones

Support for LX branded zones is in OmniOS up from release 151019 and is enabled after a pkg install brand/lx

Setup of a zone is basically:

- create a zone configuration via zonecfg

- install a VM/container via zoneadm from a ZFS snapfile \*.gz (setup -s) or a tgz tarball (setup -t)

- boot the VM/container

- login to the zone

#### You must care about permissions: All vm-folder belo2 /pool/zones muts be set to permission 700

LX branded zones is a lightweight container virtualisation of Linux VMs and is included in different Solaris and OmniOS releases. The following is tested on OmniOS release 151019 and up only and may not work on others.

### 2.1 Folder structure

While you can store VMs containers on any place, napp-it suggests them in /'datapool'/zones to display their state and to manage them in napp-it without any settings even if they are only on disk and not yet configured or in a running state meaning that OmniOS and a zonemanagement tool like zonecfg is not aware of them. This will allow that a folder move or clone is enough to handle them as napp-it assumes that all folders below zones (beside shared) is a container. Install your zones therefor under /pool/zones Below zones, add filesystem or folder with the zone name ex plex with the zone config file inside ex zone.cfg and with the container ex /datapool/zones/ plex-0.9/ (subfolder root with the container)

It is possible then to setup and import a VMs from the list of available zones under /datapool/zones similar to ESXi where a folder restore and import with a mouse right click to a .vmx config file is enough to import and run a VM. The default distribution method would be a compressed image from that folder ex plex including the the zone config file and the container inside.

Suggested folder structure (can be ZFS filesystems or sinple folders)

datapool/zones

/shared	# use to share data between your containers/VMs
/centos-6.8	# a CentOS folder with the container, config file, docs, manuals etc
/plex-0.9.11	# a Plex folder with the config file, docs, manuals etc

You should decide if you want a ZFS filesystem for each zone - especially if you install containers with the -s option as a filesystem or if you only want them all to be a simple folder below the filesystem zones. This would allow a simpler handling and you can replicate all containers without the need of the recursive option in zfs send (gives problems on incremental replications when you add or remove a filesystem). A workaround when you must install from a ZFS snap, rename the ZFS filesystem afterwards, copy over to a simple folder and destroy the filesystem then. If possible install containers with - setup -t tarball (.tgz) option.

If you want to redistribute a preconfigured zone, use a compressed zip image of the zone folder with the container and a zone.cfg and additional docs or manuals inside. Restore means a copy the folder back to ../zones, edit the zone.cfg (ex current nics or shares), import and run.



### 2.2 Example: Setup a zone with a CentOS container

The examle creates a filesystem ex /box9/centos-6.8/container during zoneadm install with permissions is set to 700 (all containers require 700) In this example, we use a vnic Ix0 within the container

- Step1: you must create the vnic lx0 manually in a first step if you want to use it in zonesettings ex dladm create-vnic lx0 -l e1000g0
- Step 2: create a parent ZFS filesystem /'datapool/zones/centos-6.8 for your Centos Container. This is needed as this example wants to restore the container as a ZFS filesystem.
- Step 3: Configure the zone centos-6.8: Open a console as root and enter: zonecfg -z centos-6.8 after the zonecfg prompt enter (my pool is named box9, use your poolname, the zonename is centos-6.8):
- Step4: care about 700 permission (ex chmod -R 700 /tank/zones/ centos-6.8/ ) This is done automatically from napp-it up from 17.01

create -b set zonepath=/box9/zones/centos-6.8 set brand=lx set autoboot=false set ip-type=exclusive add net set physical=lx0 end add attr set name=kernel-version set type=string set value=2.6.32 end commit exit

#### Step 4: Install CentOS (enter as root at console)

cd /root curl -o centos6.zss.gz https://images.joyent.com/images/5b7e86e4-2797-11e6-b7d7-cbe6a1a48791/file zoneadm -z centos-6.8 install -s /root/centos6.zss.gz # creates a ZFS filesystem defined in set zonepath

can the zone folder be a regular folder or must it be a ZFS filesystem???

#### Step 5: Boot CentOS (enter as root at console)

zoneadm -z centos-6.8 boot;

- Step 6: Login to the CentOS console, on first login (without a root password) enter zlogin centos-6.8
- for a different console (requests a password even on first login): zlogin -C centos-6.8
- Step 7: Disconnect from the zone console with  $\sim$ . zonename#  $\sim$ .
- Step 7: Shutdown CentOS (enter as root at console) zoneadm -z centos-6.8 shutdown;

on problems: try an OmniOS reboot prior a zone boot!

### 3. Basic tasks:

**Export the zone configuration to a file, example with zone centos-6.8** zonecfg -z centos-6.8 export -f /'datapool'/zones/centos-6.8/zone.cfg

**Remove from "inventory" (keeps files intact)** zonecfg -z centos-6.8 delete -F

Import/add to "inventory" from file (you can edit manually prior import, ex nics or filesystems to use) zonecfg -z centos-6.8 -f /box9/zones/centos-6.8/zone.cfg

### 3.1 Display state of zones

current status of all installed zones ("inventory") zoneadm list -vi

current status of all configured zones ("ready to run") zoneadm list -vi

You can display all available zones even if they are not installed or configured with a simple folder listing of /'datapool'/zones. All folders beside shared can be expected as containers and imported with the zone.cfg inside.

### 3.1 Distribution and management of preconfigured zones

What would be the best was to distribute/ deploy user configured zone images (ready to import) ??

#### Add a zone to "inventory", example with datapool "box9"

zonecfg -z centos-6.8 -f /box9/zones/centos-6.8/zone.cfg zoneadm -z centos-6.8 attach zoneadm -z centos-6.8 boot zlogin centos-6.8

- # add to configured ("inventory")
  # add to installed (ready)
- # boot the vm
- # Linux console (exit via ~.)

#### Remove a zone from "inventory"

zoneadm -z centos-6.8 shutdown zoneadm -z centos-6.8 detach zonecfg -z centos-6.8 delete -F

- # optional when running
- # remove from configured
- # remove from installed

#### Delete a VM after you removed it from inventory

Delete the folder/filesystem ex /box9/zones/centos-6.8

# 4. Other examples/ container

### 4.1 setup a Linux Plex VM

see http://lightsandshapes.com/plex-on-smartos.html

This example is intended for SmartOS. If you got it running on OmniOS, please share a step by step manual ex in https://forums.servethehome.com/index.php?threads/omnios-now-includes-lx-support-from-joyent-smartos.11577/

I will add the steps here

I hope for more Linux containers with services to come

### 4.2 use other Container

If you can add hints about adding other container ex Docker, Proxmox, please share

### 5.0 Management via napp-it 26.10 dev or newer (todo)

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home » Add-Ons » zones setup [ show ]			PF	RO Monitor: 14:33 29s	Pool 🖯 🖸	ap 🖯	Disk 🖯	Net 🖯 CPU	Job 🖯	0
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UUID	Ix-centos-6_20150320 Ix-ubuntu-14.04_20150415 Ix-debian-7_20150415									
Description	Ix-centos-6_20150415           Ix-debian-7_20150601           Ix-centos-6_20150601           Ix-centos-6_20150601           Ix-untus-14.04_20150601           centos-6_20150618           centos-6_20150618           debian-7_20150601           ubuntu-14.04_20150618           ubuntu-14.04_20150618           ubuntu-14.04_20150625									
Kernel/ version/ zone type/ brand	debian-7_20150625 centos-6_20150625 ubuntu-14.04_20150629									
Published at/ State/ Public/ Disabled	debian-7_20150629 v									
Min. 7 Platform (refers to SmartOS)	20150316T201553Z									
Size/ compress	100195083 /gzip									
Set values (please set, add more values later)										
Create a new zone in folder (zonepath)	/box9/zones/lx-debian-7_20150320									
please create a vnic for every VM first, use exclusive as default Network lp_type	exclusive $\bigtriangledown$									
Network physical (create vnics prior zone setup)	igb6 🗸									

menu Add-Ons >> zones setup

napp-it gives you an overview over all container in /zones, allows to create or edit their zone.cfg configuration files and to add a zone then to inventory/ configured zones. You can attach/detach/install/boot/shutdown zones or delete/ remove them from inventory (without delete files) so you can reconfigure/ readd them.

If you want to check or edit the menu script for zone edting: /var/web-gui/data/napp-it/zfsos/21\_Add-On/action.pl

€ 0 172.1	6.16.3:81/co	i-bin/admin.p	ol?id=admin,147	6428727	,iblb(	Qf1Zr	nZgx4	zRH&I1	=21_Add-On&l2=&l3	=∝=	C <sup>4</sup>	🔍 ls checj di	re⇒ tå	Ê		+	â	ø	Ξ
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menu Add-ons (start/stop)

# Add a filesystem to a LX zone:

```
is done similar to The Solaris docs, see:
https://docs.oracle.com/cd/E19044-01/sol.containers/817-1592/gcziw/index.html
```

```
add fs
set dir=/media (zone full path)
set special=/tank/media (global zone path)
set type=lofs
end
```

# 5.0 Comments and ideas?

please send an email to community@napp-it.org



### Example Ubuntu: Open Menu Add-Ons >> zones setup and select "Ix-ubuntu-14.04\_20150320"

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zones setup /tank/zones							cm	^ ۵
Zone details from https://images.joyent.com/images	lx-ubuntu-14.	04_20150	0320	$\checkmark$				
Default values (readonly)								
UUID	818cc79e-ceb	3-11e4-99	9ee-7bc8c674e754					
Description	Built to ru	in on co offer	Ubuntu 14.04 64 ontainers with ing all the ser	bare metal				
Kernel/ version/ zone type/ brand	linux/ 3.13.0/ I	lx-datase	t/ lx					
Published at/ State/ Public/ Disabled	2015-03-20T0	3 /active /	/true /false					
Min. 7 Platform (refers to SmartOS)	20150316T201	1553Z						
Size/ compress	161814833 /gz	tip						
Set values (please set, add more values later)								
Create a new zone in folder (zonepath)	/tank/zones/b	k-ubuntu	-14.04_20150320					
please create a vnic for every VM first, use exclusive as default Network ip_type	exclusive 🗸							
Network physical (create vnics prior zone setup)	e1000g1 🗸	]						
Network ip/dhcp + netmask ex 192.168.1.0/24	192.168.1.0/24	ŧ						
Gateway	192.168.1.254							
DNS server ex Google DNS	8.8.8.8							
Domain	example.com							
Filesystems (fs type lofs)								
add zfs /tank/zones/shared, mount as /shared	yes 🗸							
add zfs pool/filesystem	-		~					
and mount as /filesystem	/zfs							
wanted? (please share 1ns1ghts on Omn1OS)								
submit								~

Please care about:

- create new zone in folder:
- network ip\_type
- network physical

must be unique folder below /pool/zones. pool/zones must exist!! select exclusive

- use a different nic for every vm, best create a vnic prior setting ex lx\_1 add the correct ip settings and your network will work immediatly - network ip - gateway and DNS add the correct ip settings and your network will work immediatly
- filesystem shared
- add filesysten
- mount as /xx

select yes and /pool/zones/shared will be available as /shared (must exist!!)

select a filesystem for mounting ex/pool/filesystem this filesystem will be available in the VM as /xx

You can now sconfigure and start the VM in menu add-ons Open a console (Putty) and login to the VM: # zlogin lx-ubuntu-14.04\_20150320

If a ping 8.8.8.8 works but DNS does not work ex if ping www.google.com returns an error, try the following command at console: echo 'nameserver 8.8.8.8' >> /etc/resolv.conf

#### If network is working

apt-get update	reload repository
optionally install apps like th apt-get install mc	e midnight commender filebrowser install midnight commande, start with mc
Disconnect VM: ~.	the command ~. disconnects the VM console

#### optionally Upgrade Linux

apt-get update apt-get dist-upgrade

#### Example of a complete zone.cfg (Ubuntu)

```
create -b
set zonepath=/tank/zones/lx-ubuntu-14.04_20150320
set brand=lx
set autoboot=false
set ip-type=exclusive
add net
set physical=e1000g1
add property (name=gateway,value="172.16.4.253")
add property (name=ips,value="172.16.99.99/16")
add property (name=primary,value="true")
end
add attr
set name=dns-domain
set type=string
set value=example.com
end
add attr
set name=resolvers
set type=string
set value=8.8.8.8
end
add attr
set name=kernel-version
set type=string
set value=3.13.0
end
add fs
set dir=/shared
set special=/tank/zones/shared
set type=lofs
end
add fs
set dir=/zfs
set special=/tank/test
set type=lofs
end
```

# 5.0 Links

OmniOS supports LX Container from SmartOS: https://www.youtube.com/watch?v=TrfD3pC0VSs&list=PLH8r-Scm3-2VmZhZ76tFPAhPOG0pvmjdA&index=6 https://www.infoq.com/news/2016/03/containers-summit-nyc http://cuddletech.com/?p=953

https://wiki.smartos.org/display/DOC/LX+Branded+Zones https://blog.jasper.la/docker-on-smartos-the-harder-way/

more

http://www.logiqwest.com/dataCenter/Demos/RunBooks/Zones/zoneStatus.html https://docs.oracle.com/cd/E36784\_01/html/E36871/zonecfg-1m.html https://docs.oracle.com/cd/E36784\_01/html/E36871/zoneadm-1m.html#scrolltoc https://docs.oracle.com/cd/E22645\_01/html/817-1592/z.conf.start-81.html#z.conf.start-82

example: Plex Mediaserver as an LX container http://lightsandshapes.com/plex-on-smartos.html