

# VDCF - Virtual Datacenter Cloud Framework for the Solaris™ Operating System

## Installation Guide for Solaris 10

Version 7.2  
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## 1 Introduction

This documentation describes the Virtual Datacenter Cloud Framework (VDCF) for the Solaris 10 Operating System, Version 7.2 and explains how to plan for the product, how to install it and verify that the installation was successful.

Using VDCF installed on Solaris 10, you are able to manage Solaris 10 Nodes (global zones), LDoms (logical domains) and vServers (non-global zones).

**It is highly recommended to install VDCF on Solaris 11 and to migrate existing Solaris 10 VDCF Environments to Solaris 11. Oracle will end providing Patches for Solaris 10 in 2021.**

To manage Solaris 11 systems you need to install VDCF on Solaris 11.

See these other documents for further information:

<i>VDCF – Release Notes</i>	for details about the new release
<i>VDCF – Quick Reference</i>	for a short command overview
<i>VDCF – Installation Solaris 11</i>	for VDCF installation on Solaris 11
<i>VDCF – Proxy</i>	for information about running VDCF using Proxies
<i>VDCF – Administration Guide</i>	for information about VDCF usage
<i>VDCF – Resource Management</i>	for information about VDCF Resource Management
<i>VDCF – Monitoring</i>	for information about VDCF Monitoring (HW, Resource, OS)

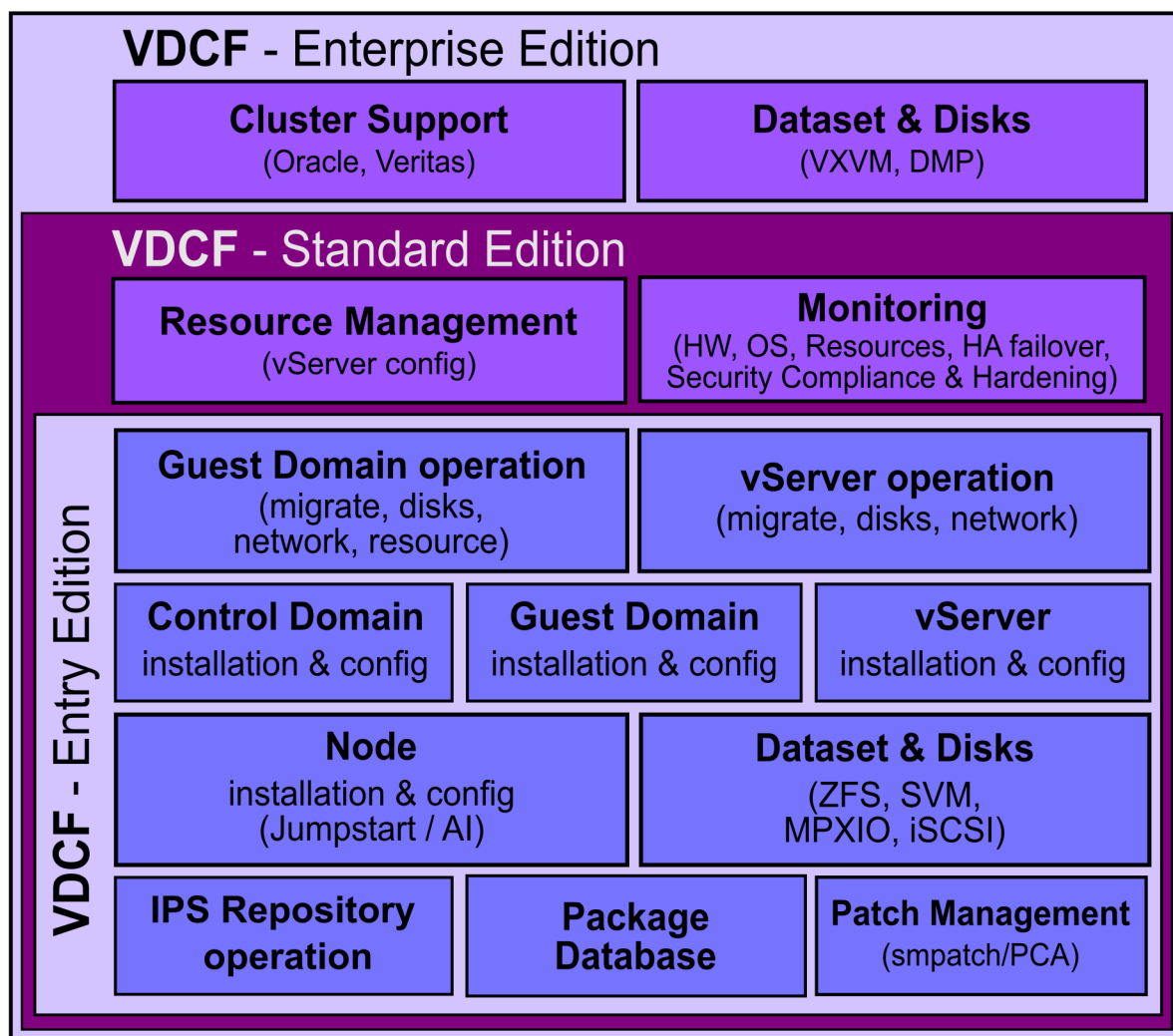
These and all other VDCF documents can be found at:

<https://www.jomasoft.ch/vdcf/#js-docu>

## 1.1 Overview

VDCF is a platform management framework for the Solaris Operating System. VDCF allows you to run a virtualized data center using Solaris 10 and Solaris 11 Containers and/or Logical Domains controlled by a centralized management server.

With VDCF, JomaSoft offers a tool to simply and effectively operate your Solaris based virtual data center. On a central management server you create definitions and configuration, which are stored in the Configuration Repository. This information is then used by VDCF to populate physical servers with a Solaris build from which virtual servers or logical domains are created.



VDCF is installed in the Global Zone of a Solaris 10 Server. From this server you install and operate your physical servers (Nodes / Control Domains), Guest Domains and your virtual servers (Containers/Zones).

## 1.2 Supported Environments

Currently the following Solaris 10 System Environments are supported

- Management Server Oracle SPARC Server and x86 Server
- Compute Node/Server Fujitsu SPARC M10 and M12 Server  
Oracle SPARC Server and x86 Server  
Fujitsu SPARC M10 and M12 Server
- Solaris Operating System Solaris 10 Update1 (1/06) up to Update 11 (1/13)
- Logical Domains LDoms 1.1/1.2/1.3/2.0/2.1/2.2/3.0/3.1/3.2
- Branded Zones solaris8, solaris9
- Volume Manager Solaris Volume Manager (SVM), ZFS
- Filesystem Solaris UFS, lofs, ZFS
- SAN / iSCSI Storage and HBA's compatible to  
SUN StorEdge SAN 4.4.x / Multipathing using STMS/MPXIO  
iSCSI Targets compatible to Solaris iSCSI Initiator
- Terminal Server Blackbox, Cyclades, IOLAN
- System Controller ILOM, XSCF, SC/ALOM, RSC, SSC, 15K, ALOMCMT, ILOMx86
- Network Link aggregation, IPMP and tagged VLAN for LDoms and vServer  
vServer exclusive ip-stack

For VDCF Standard & Enterprise customers the following Extensions are available:

- Resource Management Administration of vServer Resource settings
- Monitoring Hardware, Resource, OS Monitoring, HA/Automated Failover

For VDCF Enterprise customers the following Extensions are available:

- Veritas Dataset Volume Manager: VXVM, Filesystem: vxfs
- Sun/Solaris Cluster Integration of vServers in Sun Cluster  
Integration of LDoms/GDoms in Solaris Cluster
- Veritas Cluster Integration of vServers in Veritas Cluster

Other environments may only need small enhancements. Send us your request !

## 2 Installation

### 2.1 Prerequisites

#### 2.1.1 Management Server & Solaris

The Management Server must be installed using Solaris 10 Update 1 or later, with at least the “Developer Solaris Software Group” (SUNWCprog).

The Locale `en_US.ISO8859-1` (Package `SUNWnamos`) is required to be installed on the Management Server. Use the command `locale -a` to check.

Normally the VDCF framework is installed in the global zone. It is also supported to install VDCF in a non-global zone: See Appendix 4.2 (Installing VDCF in a non-global zone) for details and limitations.

#### Solaris Installation Images & Bootserver

A Bootserver must be setup on the Management Server. A utility for setting up a Bootserver is provided by the VDCF framework. Solaris 10 1/06 or later CD or DVD ready is required. As an alternative you may already have setup the Solaris installation image on the management server.

#### Build / Flash archive

The VDCF framework uses the flash archive technology when installing the compute nodes. Tools to build such flash archives are provided with VDCF. It is highly recommended to use the same flash archive for all compute nodes to create a standardized environment. The flash archive including one Solaris software release is called a build in VDCF terminology. It must contain at a minimum `SUNWCuser` and the packages `SUNWwgetu`, `SUNWwgetr` (`SUNWCwget Cluster`) and `SSH`.

#### Required Solaris 10 Patches

The flash archive/build must include the following patches

<code>sparc</code>	<b>121118-22</b> or later (Sun Update Connection Client, <code>smpatch</code> )
<code>i386</code>	<b>121119-22</b> or later (Sun Update Connection Client, <code>smpatch</code> )

#### Disk space

100 MB free space in <code>/usr/local</code>	to install the prerequisite software
40 MB free space in <code>/opt/</code>	to install the VDCF framework
4 GB free space in <code>/var/opt</code>	where VDCF stores its data
40 GB free space in <code>/export</code>	to store flash archives and installation configuration

#### 2.1.2 Network

A dedicated „Management Network“ is required, which connects the Management Server to the Compute Server and their system controllers.

### 2.1.3 Installing the Prerequisites

The VDCF framework also requires installation of the following freely available software. These must be installed prior to installing the VDCF framework on the management server. You may already use some of the required software.

It is highly recommended to use the installation script `install_vdcf_prereqs`:

```
# cd <download-dir>/vdcf_prereqs

# ./install_vdcf_prereqs
Checking VDCF Prerequisites ...
Installing SMClgcc346 ...
Installing SMCTk ...
Installing SMCTcl ...
Installing SMCexpect ...
Installing SMCncurs ...
Installing SMCreadl ...
Installing SMCsqlite ...
Check /var/tmp/vdcf_prereqs.log for pkgadd details.
Finished
```

The script will install the packages listed here:

a) on the sparc platform:

```
cd <download-dir>/vdcf_prereqs/sparc

pkgadd -G -d ./libgcc-3.4.6-sol10-sparc-local SMClgcc346
pkgadd -G -d ./tk-8.4.9-sol10-sparc-local SMCTk
pkgadd -G -d ./tcl-8.4.9-sol10-sparc-local SMCTcl
pkgadd -G -d ./expect-5.40-sol10-sparc-local SMCexpect
pkgadd -G -d ./ncurses-5.5-sol10-sparc-local SMCncurs
pkgadd -G -d ./readline-5.2-sol10-sparc-local SMCreadl
pkgadd -G -d ./sqlite-3.7.2-sol10-sparc-local SMCsqlite
```

b) on the i386 platform:

```
cd <download-dir>/vdcf_prereqs/x86

pkgadd -G -d ./libgcc-3.4.6-sol10-x86-local SMClgcc346
pkgadd -G -d ./tk-8.4.9-sol10-intel-local SMCTk
pkgadd -G -d ./tcl-8.4.9-sol10-intel-local SMCTcl
pkgadd -G -d ./expect-5.40-sol10-intel-local SMCexpect
pkgadd -G -d ./ncurses-5.5-sol10-x86-local SMCncurs
pkgadd -G -d ./readline-5.2-sol10-x86-local SMCreadl
pkgadd -G -d ./sqlite-3.7.2-sol10-x86-local SMCsqlite
```

## 2.2 Installing the VDCF Framework

### 2.2.1 Overview

The VDCF framework is installed into `/opt/jomasoft/vdcf`.

The framework itself consists of the following software packages:

a) Installed on the management server

- VDCF Base Components
  - JSvdcf-base - JomaSoft VDCF Base Framework  
Includes Features for Patching, LDoms and vServers/Zones

For Standard and Enterprise customers the following Packages are additionally installed

- JSvdcf-rm - JomaSoft VDCF Resource Management
- JSvdcf-monitor - JomaSoft VDCF Hardware, Resource and OS Monitoring

b) Installed on the compute servers

This client package is installed automatically by the framework when installing a new compute node:

- JSvdcf-client - JomaSoft VDCF Client



### c) Directories

When installing the base framework for the first time, the required directories and the configuration repository are initialized. The required ssh key is generated for the root User. The ssh key is used for ssh connections from the management server to the compute server, when initiating "Remote Execution".

<code>/export/install/flash</code>	This is the default directory where the installation configuration and the flash archives (builds) for the compute server are stored. This directory will be visible through a web server. This directory is managed through the VDCF framework commands.
<code>/var/opt/jomasoft/vdcf/db</code>	This directory contains the configuration repository. It's recommended to backup this directory regularly.
<code>/var/opt/jomasoft/vdcf/conf</code>	various configuration files, like <code>customize.cfg</code> , partitioning, build profile, etc
<code>/var/opt/jomasoft/vdcf/config</code>	This directory contains the additional packages, custom scripts and files . used when installing a node or vServer. This directory is managed by the system administrator.
<code>/var/opt/jomasoft/vdcf/log</code>	The framework is logging into this directory

## 2.2.2 Download and Installation

VDCF can be downloaded as bundles. Based on your License you download the Free Edition, Entry, Standard or Enterprise bundle. Each bundle contains the packages you are entitled to.

```
$ gunzip vdcf_enterprise_7.2.0_sparc.tar.gz
$ tar xf vdcf_enterprise_7.2.0_sparc.tar
```

### Installing the VDCF packages

```
# ./vdcf_bundle/vdcf_install
```

```
Adding packages ...
```

```
JSvdcf-base           ... done
JSvdcf-monitor        ... done
JSvdcf-rm             ... done
```

```
VDCF Install successful.
```

```
Check /var/tmp/vdcf_install.log for details.
```

## 2.3 Upgrading the VDCF Framework

The file name to use depends on your VDCF license (entry, standard or enterprise).

```
$ gunzip vdcf_enterprise_7.2.0_sparc.tar.gz
$ tar xf vdcf_enterprise_7.2.0_sparc.tar
```

Run the upgrade as root:

```
# ./vdcf_bundle/vdcf_upgrade
```

VDCF Package Overview (vdcf / 25.03.2019 07:04:11)

Package	Installed	Available	Upgrade
SMCsqlite	3.7.2	3.7.2	
JSvdcf-base	5.5.4	7.2.0	YES
JSvdcf-patch	5.5.4	-	REMOVE
JSvdcf-vserver	5.5.4	-	REMOVE
JSvdcf-ldom	5.5.4	-	REMOVE
JSvdcf-monitor	2.3.6	3.1.0	YES
JSvdcf-rm	3.2.8	3.4.0	YES

Execute VDCF Upgrade (Y/N)? Y

Removing packages ...

```
JSvdcf-rm          ... done
JSvdcf-monitor     ... done
JSvdcf-ldom        ... done
JSvdcf-vserver     ... done
JSvdcf-patch       ... done
JSvdcf-base        ... done
```

Adding packages ...

```
JSvdcf-base        ... done
JSvdcf-monitor     ... done
JSvdcf-rm          ... done
```

VDCF Upgrade successful.

Check /var/tmp/vdcf\_upgrade.log for details.

TODO: Upgrade your Nodes using: vdcfadm -c update\_node all

### 2.3.1 Replace VDCF prerequisites

If your previous VDCF version is older than version 5.0, you need to replace some of the VDCF prerequisites software using the installation script `install_vdcf_prereqs`.

SMCsqlite 3.6.13 is replaced by SMCsqlite 3.7.2

A typical upgrade looks like this:

```
# cd <download-dir>/vdcf_prereqs

# ./install_vdcf_prereqs
Checking VDCF Prerequisites ...
Found old prerequisite SMCsqlite (Version: 3.6.13)
Removing this package now ...
Removal of <SMCsqlite> was successful.
Found SMClgcc346 package
SMClgcc346 libgcc
(sparc) 3.4.6
VDCF skips installation of SMClgcc346 (Version: 3.4.6)
Found SMGtk package
SMGtk tk
(sparc) 8.4.9
VDCF skips installation of SMGtk (Version: 8.4.9)
Found SMGtk package
SMGtk tcl
(sparc) 8.4.9
VDCF skips installation of SMGtk (Version: 8.4.9)
Found SMCexpect package
SMCexpect expect
(sparc) 5.40
VDCF skips installation of SMCexpect (Version: 5.40)
Found SMCncurs package
SMCncurs ncurses
(sparc) 5.5
VDCF skips installation of SMCncurs (Version: 5.5)
Found SMCreadl package
SMCreadl readline
(sparc) 5.2
VDCF skips installation of SMCreadl (Version: 5.2)
Installing SMCsqlite ...
Check /var/tmp/vdcf_prereqs.log for pkgadd details.
Finished
```

### 2.3.2 Install new packages

```
# cd <download-dir>/vdcf_bundle  
pkgadd -d ./JSvdcf_<version>_<platform>.pkg all  
pkgadd -d ./JSvdcf-...
```

Normally it's necessary to upgrade the JSvdcf-client package installed on the Nodes manually:

```
vdcfadm -c update_node all
```

Check the Release Notes for additionally required tasks.

## 2.4 Configuring the VDCF Framework

After installing the VDCF framework, some configuration and integration into your system environment is required.

You can either configure the framework manually or use the setup script, which does it automatically.

### 2.4.1 Automatically setup framework with `setup_vdcf`

A good starting point is the use of the setup script to configure initial settings for the framework. This includes the web server configuration (chapter 2.4.2) and the needed variables in the configuration (chapter 3.1.1). If you use the setup script, manually configuration steps for apache should not be needed afterwards, except there are special requirements needed.

Run the script as root:

```
root@vdcf$ /opt/jomasoft/vdcf/mods/setup/setup_vdcf -a

Gathering information...
Getting password hash from /etc/shadow of user root
Looking for hosts management IP address
Modifying /var/opt/jomasoft/vdcf/conf/customize.cfg ...
Creating backup file as /var/opt/jomasoft/vdcf/conf/customize.cfg_2013.09.03-13.55.31
Setting FLASHPWD to 'TI0G9i/hL43nU'
Setting AI_ADMINPWD to 'TI0G9i/hL43nU'
Setting FLASH_BOOTSERVER_IP to "192.168.20.67"
Setting FLASH_WEBSERVER_URL to "http://192.168.20.67"
Setting FLASH_PUBLIC_WEBSERVER_URL to "http://192.168.20.67"
Setting WEBSEVERER_URLS to "192.168.20.0;http://192.168.20.67
default;http://192.168.20.67"
Setting CONFIG_NETMASK_DEFAULT to
"DEFAULT:255.255.255.0,MNGT:255.255.255.0,PUBL:255.255.255.0,BACK:255.255.255
.0"
Setting PATCH_SOURCE_URL to "http://192.168.20.67:3816"
Modifications in /var/opt/jomasoft/vdcf/conf/customize.cfg done.
Configuring apache web server...
Apache config file /etc/apache2/httpd.conf not found, copying from
/etc/apache2/httpd.conf-example
VDCF config file /etc/apache2/vdcf.conf not found, creating
Creating include entry in /etc/apache2/httpd.conf
Enabling SMF apache2
Apache web server configuration done.
Finished configuration of VDCF environment.
```

If you have more than one network interface configured on the system, you have to specify the management interfaces ip address on the command line with '-i <mngt\_ip>'.

## 2.4.2 Manually setup of Web server / Apache

This steps are not needed, if you have run the setup script from chapter 2.4.1 before.

When installing a compute node, the configuration and flash archives are delivered through a web server. You may already run a web server, where you add the required configuration.

### a) Technical User

The web server user must be set to `webservd`. This requirement ensures the permissions are in place that enable execution of the VDCF commands. At VDCF installation RBAC entries are created for the user `webservd`.

### b) Directories

The document root directory for the web server must be set to `/export/install/flash`.  
cgi scripts run from `/opt/jomasoft/vdcf/mods/install/cgi`.

### c) Apache

This is an example of the required additional configuration for the Apache 2.0 web server.  
A `httpd.conf` file containing the required configuration statements is provided in  
`/opt/jomasoft/vdcf/conf/sysconf`.

Update your Apache configuration file `/etc/apache2/httpd.conf`.

It is highly recommended to create a VirtualHost configuration for VDCF. It is even possible to create multiple configuration with ip-addresses in different networks and to use different ports. Remember to add `Listen` statements for additional ports.

```
<VirtualHost *:80>
    DocumentRoot /export/install/flash

    Alias /scripts/ "/opt/jomasoft/vdcf/mods/install/cgi/"
    Alias /rexec/ "/opt/jomasoft/vdcf/rexec/"
    <Directory /opt/jomasoft/vdcf/mods/install/cgi>
        Options +ExecCGI
    </Directory>
    AddHandler cgi-script .cgi

    # All client access is denied except the list of allowed Networks
    # from the list beneath. Add your networks/IPs here:
    <Location />
        Order deny,allow
        Deny from all
        Allow from x.x.x.0/24
        Allow from y.y.y.y/32
    </Location>

</VirtualHost>
```

After the modifications restart your Apache web server using the appropriate commands:

```
svcadm restart apache2    (if Apache is already running)
```

```
svcadm enable apache2     (if starting for the first time)
```

### 2.4.3 RBAC and Users

VDCF provides the following RBAC profiles, which must be configured for your administration staff.

VDCF Logger	required for all users, to be able to log framework messages
VDCF admin Module	vdcf administration
VDCF install Module	node installation
VDCF node Module	node operations
VDCF config Module	node and vServer customization
VDCF disks Module	disk management
VDCF dataset Module	dataset management
VDCF virtual Module	vServer management and operations
VDCF ldom Module	ldom management and operation
VDCF patches Module	patch management for nodes, guest domains and vServers
VDCF computepool Manager	computepool management
VDCF computepool User	computepool display
VDCF vpool Manager	virtualpool management
VDCF vpool User	virtualpool display
VDCF serverconfig exec	serverconfig execution
VDCF pkg Module	package management
VDCF readonly	All read only modules (No update functions included)

Add the Profile entries to `/etc/user_attr` for your administrators. All users with the above RBAC Profiles are allowed to execute the VDCF commands found in `/opt/jomasoft/vdcf/bin`.

Sample entry from `/opt/jomasoft/vdcf/conf/sysconf/etc_user_attr`

```
marcel:::type=normal;profiles=VDCF Logger,VDCF admin Module,VDCF install \
Module,VDCF node Module,VDCF config Module,VDCF disks Module,VDCF dataset \
Module,VDCF virtual Module,VDCF patches Module,VDCF computepool Manager,VDCF \
ldom Module,VDCF vpool Manager,VDCF pkg Module
```

If you would like to create a VDCF administration user, use the following command

```
useradd -d /export/home/vdcf -m -s /bin/bash -P "VDCF Logger,VDCF admin \
Module,VDCF install Module,VDCF node Module,VDCF config Module,VDCF disks \
Module,VDCF dataset Module,VDCF virtual Module,VDCF patches Module,VDCF \
computepool Manager,VDCF ldom Module,VDCF vpool Manager,VDCF pkg Module" vdcf
```

### 2.4.4 Admin Environment

Add the following directories to you shell profile

PATH	/opt/jomasoft/vdcf/bin	VDCF commands
MANPATH	/opt/jomasoft/vdcf/man	VDCF manpages

Sample entry:

```
export PATH=/opt/jomasoft/vdcf/bin:$PATH
export MANPATH=/opt/jomasoft/vdcf/man:$MANPATH
```



## 3 Customize the VDCF Framework

### 3.1 Configuration files

#### 3.1.1 customize.cfg

There is one main VDCF configuration file: `/var/opt/jomasoft/vdcf/conf/customize.cfg`

If you have used the setup script described in chapter 2.4.1 these variables should already be set with correct values. Otherwise you have to set at least all these variables:

```
export FLASHPWD=''
    Here you store the root password set after a node or vServer is installed.
    Password must be in shadow format.

export FLASH_WEBSERVER_URL="http://10.1.1.1:80"
    Default URL of the configured web server. This URL is used on nodes and vServers
    to get the system configuration and flash archive.

export FLASH_PUBLIC_WEBSERVER_URL="http://192.168.0.1:80"
    Alternate URL of the configured web server. This URL is required if the target node is in
    another network than the management server is. This URL is used on nodes and vServers
    to get the system configuration and flash archive.

export FLASH_BOOTSERVER_IP="10.1.1.1"
    IP address of your management server

export CONFIG_NETMASK_DEFAULT="DEFAULT:255.255.255.0,MNGT:255.255.255.0,..."
    Defines default values for the 'netmask' argument used at vserver -c addnet and
    nodecfg -c add

export PATCH_SOURCE_URL="http://10.1.1.1:3816"
    URL of your patch server, usually installed on the VDCF management server
```

The following variables need at least to be modified to suit your needs, even if used the setup script:

```
export NODE_NET_ALIAS="MNGT:AUTO,PUBL:AUTO,BACK:AUTO,PROBE:AUTO"
    Defines the default speed set when configuring new nodes using the nodecfg command.
    Allowed speed settings are: AUTO,1000fdx,1000hdx,100fdx,100hdx

export CONFIG_DEFAULTS="server.group=node;server.location=RZ"
    Defines default values used when configuring new nodes using the nodecfg -c add
    command. server.group defines the default configuration groups and server.location
    defines the default location of a node.
```

### 3.1.2 Node partitioning (Solaris 10)

Node partitioning is configured as a Jumpstart profile. You may modify the default values in `/var/opt/jomasoft/vdcf/conf/partitioning.cfg`

For server specific partitioning, for example for older hardware with small disks, you can create a partitioning configuration file per node. The file name has the following format :

```
/var/opt/jomasoft/vdcf/conf/<nodename>_partitioning.cfg
```

### 3.1.3 Disk locations

To let VDCF know the locations of your data centers and storage systems you should add the qualifiers of your disk GUIDs to `/var/opt/jomasoft/vdcf/conf/disklocation.cfg`. You may use the template file `disklocation_template.cfg` as base.

More details can be found in Chapter 4.7.4 “Physical disk location” in the VDCF Administration Guide.

## 3.2 System configuration

In VDCF terminology Nodes, Guest domains and vServers are configured using Base and Server configuration. This information is stored in the configuration repository using these two VDCF commands:

- `config` (used for base configuration)
- `serverconfig` (used for server configuration)

Base configuration contain the effective system configuration values, for example DNS server ip addresses. In Server configuration you assign the Base configuration to nodes, vServers or server groups. A base configuration without a server configuration is useless and makes no sense. Only configuration data mapped to a server (or a group of server) is applied at installation time!

This chapter describes the required and recommended Base configuration. Check the VDCF Administration Guide and the manpages of “`config`” and “`serverconfig`” for detailed information about system configuration.

The file `/opt/jomasoft/vdcf/conf/sysconf/vdcf_system_configs` contains the recommended commands and templates for the mentioned commands below.

### 3.2.1 Required configuration

#### a) SCSI\_VHCI

For non-Sun SAN storage, it is required to register the provider SCSI product id. Use the Solaris format command “`inquiry`” to display the provider and productid.

For example for an IBM storage:

```
config -c add type=SCSI_VHCI name=DS8300 provider=IBM productid=2107900
serverconfig -c add type=SCSI_VHCI name=DS8300 group=IBM
```

#### b) SVM Solaris Volume Manager required services (Solaris 10)

For SVM to work properly the following 3 SMF Services must be enabled on all Nodes.

```
config -c add type=SERVICES name=SVM enable=metainit,mdmonitor,meta
serverconfig -c add group=node type=SERVICES name=SVM
```

#### c) Defaultroute per Network

Add the Defaultroute's of your subnets. Replace 'YOURNET' with unique names to identify your networks.

```
config -c add type=DEFAULTROUTE name=YOURNET ipaddr=10.10.1.1
serverconfig -c add group=<yourgroup> type=DEFAULTROUTE name=YOURNET
```

Use the configuration group <yourgroup> when adding a new node running in this network with `nodecfg -c add`.

#### d) DNS

```
config -c add type=DNS name=PROD server=192.168.0.1,192.168.0.2 \
domain=yourdomain.com search=yourdomain.com
```

```
serverconfig -c add type=DNS name=PROD
```

### 3.2.2 Recommended configuration

The following commands are not required for VDCF, but their use is recommended.

#### a) Disable insecure SMF services

Here is a sample command for disabling some 'unwanted' SMF services.

```
config -c add type=SERVICES name=HARDENING \
disable=telnet,sendmail,print/server,rstat

serverconfig -c add type=SERVICES name=HARDENING
```

#### b) NTP time services

If NTP is used in your environment replace ntp1 and ntp2 with your NTP timeservers.

```
config -c add type=NTP name=PROD server=ntp1,ntp2
serverconfig -c add type=NTP name=PROD
```

#### c) Users

It is recommended to add the administration users after installing a system.

With VDCF you do this using a script which must be stored in  
/var/opt/jomasoft/vdcf/config/script

Sample Script:

```
#!/bin/ksh

# Script: add_users
# Usage: Adds admin users

add_user() {

    typeset username=$1

    # add user, if not already defined
    if ! grep "^$username:" /etc/passwd >/dev/null; then
        useradd -d /export/home/$username -s /bin/bash -m $username
        passwd -df $username
    fi

    if [[ "$(uname -r)" = 5.11 ]]; then
        echo "Solaris 11, add role root to user: $username"
        /usr/sbin/usermod -R +root $username
    fi
}

add_user yourname

config -c add type=SCRIPT name=USERS script=add_users
serverconfig -c add type=SCRIPT name=USERS
```

### 3.3 Next Steps

The VDCF framework is now configured and ready to use.

The following steps are documented in the VDCF Administration Guide:

a) Produce a build and install a node

- Configure a Build (flash archive) to install using the build command
- Discover and add a node to the VDCF configuration repository (nodecfg command)
- Enable the Build to be installed on the target node (flash command)
- Install the node (node command)

b) Deploy vServers

- Configure Datasets and vServers (dataset and vservers command)
- Install the vServer (vservers command)

c) Build a Control domain and deploy Guest Domains

- Setup control domain (cdom command)
- Install a guest domain (gdom command)

## 4 Appendixes

### 4.1 Firewall Rules

If your system environment contains firewalls you may have to define firewall rules. These rules are required for a correct execution of VDCF:

a) Firewall rules between Management Server and Target Nodes or Guest Domains

VDCF Management Server	Direction	Targets (Nodes, GDOMs)	Comment
	-->	ssh (port 22)	Required for Remote Command Execution
	-->	System Controller	Depending on type of System Controller (telnet or ssh)
	-->	icmp ping	Check for availability (optional)
WebServer (port 80)	<--		Web server port (see chapter 2.4.2)
Patch Proxy (port 3816)	<--	Solaris 10 only	Port of the Solaris patch proxy (optional)

The following rules are additionally required if you install X86 Nodes (using PXE)

VDCF Management Server	Direction	Targets	Comment
tftp (udp 69)	<--	Node	PXE Boot / Jumpstart to transfer kernel
NFS (port 2049)	<--	Node	Solaris Jumpstart

b) Firewall rules between Management Server and vServers

VDCF Management Server	Direction	Targets (nodes, domains, vServers)	Comment
	→	ssh (port 22)	Required for Remote Command Execution
WebServer (port 80)	←		Web server port (see chapter 2.4.2)

#### c) Firewall Rules and/or Internet Proxy Settings between Management Server and Internet

These rules are required if you are using the VDCF Patch Management. Patch Management has to connect from the Management Server through an Internet Proxy to the Sun/Oracle Update Connection Servers:

VDCF Management Server	Direction	Internet Server
	-->	getupdates.oracle.com - https (port 443)
	-->	a248.e.akamai.net - https (Port 443)
	-->	cns-services.sun.com - https (Port 443)
	-->	cns-transport.sun.com - https (Port 443)
	-->	cns-services.oracle.com - https (Port 443)
	->	aru-akam.oracle.com – http (Port 80)
	->	*.deploy.akamaitechnologies.com - https (Port 443)

For details check the Oracle Support document:

**“How to Configure Minimum Requirements for smpatch and sconadm [ID 1237803.1] “**

The following rules are additionally required if you are using pca to download Solaris 10 patches (PATCH\_DOWNLOAD\_TYPE is set to PCA)

VDCF Management Server	Direction	Internet Server
	-->	login.oracle.com - https (port 443)

#### d) Firewall rules between Control Domains for Guest Domain Live Migration

Source Guest Domain	Direction	Targets Guest Domain	Comment
	→	Port 8101	LDom Migration Service
	→	Port 6482	XMPP Support

## 4.2 Installing VDCF in a non-global zone

### Global Zone – Engineering Environment

The VDCF framework must be installed in the global zone. VDCF uses Jumpstart technologies and protocols, which are not supported in a non-global zone. Use the VDCF framework in the global zone as the Engineering environment where you create BootServer environments, install Nodes using a build.profile and produce Flash archives to define Builds.

### Non-Global Zone – Deployment Environment

VDCF is installable in a non-global zone and as a deployment environment for **sparc** systems using the **WANBoot** technology. In such a deployed environment you define Builds based on the BootServer environments and archives created in the Engineering environment.

### Requirements

You must create a whole root zone for VDCF. Ideally use VDCF on the global zone to create the VDCF non-global zone.

```
zonecfg -z vdcf1  
create -b
```

Add the following devices to the zone configuration. This is required because VDCF uses lofiadm to maintain the WANBoot images.

```
add device  
set match=/dev/lofiectl  
end  
add device  
set match=/dev/lofi/*  
end  
add device  
set match=/dev/rlofi/*  
end
```

Don't forget to mark the disks used by this zone as 'FOREIGN' in the VDCF deployment environment! Or you may import the vServer information into the VDCF deployment environment. Ask JomaSoft Support for help about this task.



#### 4.2.1 VDCF Management vServer Failover

If VDCF is installed in a non-global zone it makes sense to facilitate the failover to another spare node. You may use the script `vserver_local` on the source and target Node to easily migrate the VDCF management vServer.

##### Requirements

a) VDCF base package must be installed on all potential target Nodes. Keep all VDCF installations on the same level.

b) Add the vServers dataset and zones base directory information into the config file  
`/var/opt/jomasoft/vdcf/conf/vserver_local.cfg`

You may find a template of that config file in `/opt/jomasoft/vdcf/conf/vserver_local.cfg`. Copy this file to all planned VDCF management source and target nodes.

##### Usage

a) If the source node is still active and running: use the detach option of the `vserver_local` tool:  
`/opt/jomasoft/vdcf/tools/vserver_local -d <mgmt vServer name>`

b) On the target node use the attach option:  
`/opt/jomasoft/vdcf/tools/vserver_local -a <mgmt vServer name>`

**Caution:** Please be aware that the attach function is using import force to attach the datasets. You should use it only if you are sure that the datasets aren't in use on other nodes!