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Changing private hostname](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section21) | |  | [Case II. Changing private IP only without changing network interface, subnet and netmask](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section22) | |  |  |  | | --- | --- | |  | [Case III. Changing private network MTU only](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section23) | |  | [Case IV. Changing private network interface name, subnet or netmask](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section24) | |  |  |  | | --- | --- | |  | [A. For pre-11gR2 Oracle Clusterware](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section25) | |  | [B. For 11gR2 Oracle Clusterware and 12c Cluster without Flex ASM](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section26) | |  |  |  |  | | --- | --- | --- | |  | [C. For 12c Oracle Clusterware with Flex ASM](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section27) | | |  | [Something to note for 11gR2+](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section28) |  |  |  | | --- | --- | |  | [Notes for Windows Systems](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section29) | |  | [Ramifications of Changing Interface Names Using oifcfg](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section210) | |  |  |  | | --- | --- | |  | [Oifcfg Usage](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section211) | |  | [Case V. Add or remove cluster\_interconnect for 11gR2 and above with HAIP](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#aref_section212) | |  |  |  | | --- | --- | |  | [References](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=195004741212648&amp;parent=DOCUMENT&amp;sourceId=1674442.1&amp;id=283684.1&amp;_afrWindowMode=0&amp;_adf.ctrl-state=7368web0_159#REF) |     **Applies to:**  Oracle Database - Enterprise Edition - Version 10.1.0.2 to 12.1.0.2 [Release 10.1 to 12.1]  Information in this document applies to any platform.  **Goal**  The purpose of this note is to describe how to change or update the private network (cluster\_interconnect) information in Oracle Clusterware.   It may be necessary to change or update interface names, or subnet associated with an interface if there is a network change affecting the servers, or if the original information that was input during the installation was incorrect.   It may also be the case that for some reason, the Oracle Interface Configuration Assistant  ('oifcfg')  did not succeed during the installation.   Please refer to [Note 276434.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&amp;sourceId=283684.1&amp;id=276434.1) for modifying public network and VIP associated information  and refer to [Note 1386709.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&amp;sourceId=283684.1&amp;id=1386709.1) for basics of IPv4 subnet and Oracle Clusterware.  Note: for Oracle Engineered system (Exadata) and Oracle Database Appliance (ODA), please do not make such changes following this note.    **Solution**  Network information(interface, subnet and role of each interface) for Oracle Clusterware is managed by 'oifcfg', but actual IP address for each interfaces are not, 'oifcfg' can not update IP address information. 'oifcfg getif' can be used to find out currently configured interfaces in OCR:  % $CRS\_HOME/bin/oifcfg getif  eth0 10.2.156.0 global public  eth1 192.168.0.0 global cluster\_interconnect  On Unix/Linux systems, the interface names are generally assigned by the OS, and standard names vary by platform. For Windows systems, see additional notes below. Above example shows currently interface eth0 is used for public with subnet 10.2.156.0, and eth1 for cluster\_interconnect/private with subnet 192.168.0.0.   The 'public' network is for database client communication (VIP also uses the same network though it's stored in OCR as separate entry), whereas the 'cluster\_interconnect' network is for RDBMS/ASM cache fusion. Starting with 11gR2, cluster\_interconnect is also used for clusterware heartbeats - this is **significant** change compare to prior release as pre-11gR2 uses the private nodename that were specified at installation time for clusterware heartbeats.   If the subnet or interface name for 'cluster\_interconnect' interface is incorrect, it needs to be changed as crs/grid user.  **Case I. Changing private hostname**  In pre-11.2 Oracle Clusterware, private hostname is recorded in OCR, it can not be updated. Generally private hostname is not required to change. Its associated IP can be changed. The only way to change private hostname is by deleting/adding nodes, or reinstall Oracle Clusterware.  In 11.2 Grid Infrastructure, private hostname is no longer recorded in OCR and there is no dependency on the private hostname. It can be changed freely in /etc/hosts.  **Case II. Changing private IP only without changing network interface, subnet and netmask**  For example, private IP is changed from 192.168.1.10 to 192.168.1.21, network interface name and subnet remain the same,.  Simply shutdown Oracle Clusterware stack on the node where change required, make IP modification at OS layer (eg: /etc/hosts, OS network config etc) for private network, restart Oracle Clusterware stack will complete the task.  **Case III. Changing private network MTU only**  For example, private network MTU is changed from 1500 to 9000 (enable jumbo frame), network interface name and subnet remain the same.  1. Shutdown Oracle Clusterware stack on all nodes  2. Make the required network change of MTU size at OS network layer, ensure private network is available with the desired MTU size, ping with the desired MTU size works on all cluster nodes  3. Restart Oracle Clusterware stack on all nodes  **Case IV. Changing private network interface name, subnet or netmask**  Note: When the netmask is changed but the subnet ID doesn't change, for example:  The netmask is changed from 255.255.0.0 to 255.255.255.0 with private IP like 192.168.0.x, the subnet ID remains the same as 192.168.0.0, the network interface name is not changed.  Shutdown Oracle Clusterware stack on all cluster nodes where change required, make IP modification at OS layer (eg: OS network config etc) for private network, restart Oracle Clusterware stack on all nodes will complete the task. Please note, this change can not be done in rolling manner.  When the netmask is changed, the associated subnet ID is often changed. Oracle only store network interface name and subnet ID in OCR, not the netmask. Oifcfg command can be used for such change, **oifcfg commands only require to run on 1 of the cluster node**, not all.  ***A. For pre-11gR2 Oracle Clusterware***  1. Use oifcfg to add the new private network information, delete the old private network information:  % $ORA\_CRS\_HOME/bin/oifcfg/oifcfg setif -global <if\_name>/<subnet>:cluster\_interconnect  % $ORA\_CRS\_HOME/bin/oifcfg/oifcfg delif -global <if\_name>[/<subnet>]]   For example:  % $ORA\_CRS\_HOME/bin/oifcfg setif -global **eth3**/**192.168.2.0**:cluster\_interconnect  % $ORA\_CRS\_HOME/bin/oifcfg delif -global eth1/192.168.1.0   To verify the change  % $ORA\_CRS\_HOME/bin/oifcfg getif    eth0 10.2.166.0 global public eth3 **192.168.2.0** global cluster\_interconnect  2. Shutdown Oracle Clusterware stack  As root user: # crsctl stop crs  3. Make required network change at OS level, /etc/hosts file should be modified on all nodes to reflect the change.  Ensure the new network is available on all cluster nodes:  % ping <private hostname/IP>  % ifconfig -a  on Unix/Linux  or  % ipconfig /all on windows  4. restart the Oracle Clusterware stack  As root user: # crsctl start crs  Note:  If running OCFS2 on Linux, one  may also need to change the private IP address that OCFS2 is using to communicate with other nodes.   For more information, please refer to [Note 604958.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&amp;sourceId=283684.1&amp;id=604958.1)    ***B. For 11gR2 Oracle Clusterware and 12c Cluster without Flex ASM***  As of 11.2 Grid Infrastructure, the private network configuration is not only stored in OCR but also in the gpnp profile.  If the private network is not available or its definition is incorrect, the CRSD process will not start and any subsequent changes to the OCR will be impossible. Therefore care needs to be taken when making modifications to the configuration of the private network. It is important to perform the changes in the correct order. Please also note that manual modification of gpnp profile is not supported.  Please take a backup of profile.xml on all cluster nodes before proceeding, as grid user:  $ cd $GRID\_HOME/gpnp/<hostname>/profiles/peer/  $ cp -p profile.xml profile.xml.bk  1. Ensure Oracle Clusterware is running on **ALL** cluster nodes in the cluster   2. As grid user:  Get the existing information. For example:  $ oifcfg getif  eth1 100.17.10.0 global public  eth0 192.168.0.0 global cluster\_interconnect  Add the new cluster\_interconnect information:  $ oifcfg setif -global <interface>/<subnet>:cluster\_interconnect   For example:  a. add a new interface bond0 with the same subnet  $ oifcfg setif -global bond0/192.168.0.0:cluster\_interconnect   b. add a new subnet with the same interface name but different subnet or new interface name  $ oifcfg setif -global eth0/192.65.0.0:cluster\_interconnect  or  $ oifcfg setif -global eth3/192.168.1.96:cluster\_interconnect    1. This can be done with -global option even if the interface is not available yet, but this can not be done with -node option if the interface is not available, it will lead to node eviction.   2. If the interface is available on the server, subnet address can be identified by command:  $ oifcfg iflist   It lists the network interface and its subnet address. This command can be run even if Oracle Clusterware is not running. **Please note, subnet address might not be in the format of x.y.z.0,** it can be x.y.z.24, x.y.z.64 or x.y.z.128 etc. For example,  $ oifcfg iflist  lan1 18.1.2.0  lan2 **10.2.3.64**        << this is the private network subnet address associated with private network IP: 10.2.3.86   3. If it is for adding a 2nd private network, not replacing the existing private network, please ensure **MTU size of both interfaces are the same**, otherwise instance startup will report error:  ORA-27504: IPC error creating OSD context  ORA-27300: OS system dependent operation:if MTU failed with status: 0  ORA-27301: OS failure message: Error 0  ORA-27302: failure occurred at: skgxpcini2  ORA-27303: additional information: requested interface lan1:801 has a different MTU (1500) than lan3:801 (9000), which is not supported. Check output from ifconfig command   4. For 11gR2 and higher, it is not recommended to set cluster\_interconnects in ASM or Database spfile or pfile. If this parameter is set for any reason, it needs to be changed to the new private IP in spfile or pfile prior to clusterware shutdown, otherwise it will result a failure during restart due to the interconnect mismatch.  Verify the change:  $ oifcfg getif  3. Shutdown Oracle Clusterware on all nodes and disable the Oracle Clusterware as root user:  # crsctl stop crs  # crsctl disable crs  4. Make the network configuration change at OS level as required, ensure the new interface is available on all nodes after the change.  $ ifconfig -a  $ ping <private hostname>  5. Enable Oracle Clusterware and restart Oracle Clusterware on all nodes as root user:  # crsctl enable crs  # crsctl start crs  6. Remove the old interface if required:  $ oifcfg delif -global <if\_name>[/<subnet>]  eg:  $ oifcfg delif -global eth0/192.168.0.0    ***C. For 12c Oracle Clusterware with Flex ASM***  Please review above section B and pay attention to the Note section, take a backup as follows:  Please take a backup of profile.xml on all cluster nodes before proceeding, as grid user:  $ cd $GRID\_HOME/gpnp/<hostname>/profiles/peer/  $ cp -p profile.xml profile.xml.bk  1. Ensure Oracle Clusterware is running on **ALL** cluster nodes in the cluster  2. As grid user:  Get the existing information. For example:  $ oifcfg getif  eth1 100.17.10.0 global public  eth0 192.168.0.0 global cluster\_interconnect,asm  Above example shows network eth0 is used for both cluster\_interconnect and ASM network.  Add the new cluster\_interconnect information:  $ oifcfg setif -global <interface>/<subnet>:cluster\_interconnect[,asm]  For example:  a. add a new interface bond0 with the same subnet  $ oifcfg setif -global bond0/192.168.0.0:cluster\_interconnect,asm  b. add a new subnet with the same interface name but different subnet or new interface name  $ oifcfg setif -global eth0/192.68.10.0:cluster\_interconnect,asm  or  $ oifcfg setif -global eth3/192.168.1.96:cluster\_interconnect,asm   If different network is used for private network and ASM network, then modify them accordingly.  3. As ASMLISTENER is using the private network, modifying the private network will affect ASMLISTENER. It is required to add a new ASMLISTENER with the new network configuration. Skip this step if the subnet for the ASM network is not changed.  3.1. Add a new ASMLISTENER (for example: ASMNEWLSNR\_ASM) with the new subnet, as grid user:  $ srvctl add  listener -asmlistener -l <new ASM LISTENER NAME> -subnet <new subnet>  eg:  $ srvctl add listener -asmlistener -l ASMNEWLSNR\_ASM -subnet 192.168.10.0  3.2. Drop the existing ASMLISTENER (ASMLSNR\_ASM in this example) and remove the dependency, as grid user:  $ srvctl update listener -listener ASMLSNR\_ASM -asm -remove -force  $ lsnrctl stop ASMLSNR\_ASM    Note. -force option is required, otherwise the following error will occur:  $ srvctl update listener -listener ASMLSNR\_ASM -asm -remove  PRCR-1025 : Resource ora.ASMLSNR\_ASM.lsnr is still running  $ srvctl stop listener -l ASMLSNR\_ASM  PRCR-1065 : Failed to stop resource ora.ASMLSNR\_ASM.lsnr  CRS-2529: Unable to act on 'ora.ASMLSNR\_ASM.lsnr' because that would require stopping or relocating 'ora.asm', but the force option was not specified  3.3 Verify the configuration  $ srvctl config listener -asmlistener  $ srvctl config asm  4. Shutdown Oracle Clusterware on **ALL** nodes and disable the Oracle Clusterware as root user:  # crsctl stop crs  # crsctl disable crs  5. Make the network configuration change at OS level as required, ensure the new interface is available on all nodes after the change.  $ ifconfig -a  $ ping <private hostname>  6. Enable Oracle Clusterware and restart Oracle Clusterware on all nodes as root user:  # crsctl enable crs  # crsctl start crs  7. Remove the old interface if required:  $ oifcfg delif -global <if\_name>[/<subnet>]  eg:  $ oifcfg delif -global eth0/192.168.0.0      ***Something to note for 11gR2+***  1. If underlying network configuration has been changed, but oifcfg has not been run to make the same change,  then upon Oracle Clusterware restart, the CRSD will not be able to start.   The crsd.log will show:  2010-01-30 09:22:47.234: [ default][2926461424] CRS Daemon Starting  ..  2010-01-30 09:22:47.273: [ GPnP][2926461424]clsgpnp\_Init: [at clsgpnp0.c:837] GPnP client pid=7153, tl=3, f=0  2010-01-30 09:22:47.282: [ OCRAPI][2926461424]**clsu\_get\_private\_ip\_addresses: no ip addresses found.  2010-01-30 09:22:47.282: [GIPCXCPT][2926461424] gipcShutdownF: skipping shutdown, count 2, from [ clsinet.c : 1732], ret gipcretSuccess (0)  2010-01-30 09:22:47.283: [GIPCXCPT][2926461424] gipcShutdownF: skipping shutdown, count 1, from [ clsgpnp0.c : 1021], ret gipcretSuccess (0)  [ OCRAPI][2926461424]a\_init\_clsss: failed to call clsu\_get\_private\_ip\_addr (7)  2010-01-30 09:22:47.285: [ OCRAPI][2926461424]a\_init:13!: Clusterware init unsuccessful : [44]  2010-01-30 09:22:47.285: [ CRSOCR][2926461424] OCR context init failure. Error: PROC-44: Error in network address and interface operations Network address and interface operations error [7]  2010-01-30 09:22:47.285: [ CRSD][2926461424][PANIC] CRSD exiting: Could not init OCR, code: 44  2010-01-30 09:22:47.285: [ CRSD][2926461424] Done.**  Above errors indicate a mismatch between OS setting (oifcfg iflist) and gpnp profile setting profile.xml.   Workaround: restore the OS network configuration back to the original status, start Oracle Clusterware. Then follow above steps to make the changes again.   If the underlying network has not been changed, but oifcfg setif has been run with a wrong subnet address or interface name, same issue will happen.  2. If any one node is down in the cluster, oifcfg command will fail with error:  $ oifcfg setif -global bond0/192.168.0.0:cluster\_interconnect  PRIF-26: Error in update the profiles in the cluster  Workaround: start Oracle Clusterware on the node where it is not running. Ensure Oracle Clusterware is up on all cluster nodes. If the node is down for any OS reason, please remove the node from the cluster before performing private network change.   3. If a user other than Grid Infrastructure owner issues above command, it will fail with same error:  $ oifcfg setif -global bond0/192.168.0.0:cluster\_interconnect  PRIF-26: Error in update the profiles in the cluster  Workaround: ensure to login as Grid Infrastructure owner to perform such command.   4. From 11.2.0.2 onwards, if attempt to delete the last private interface (cluster\_interconnect) without adding a new one first, following error will occur:  PRIF-31: Failed to delete the specified network interface because it is the last private interface  Workaround: Add new private interface first before deleting the old private interface.   5. If Oracle Clusterware is down on the node, the following error is expected:  $ oifcfg getif  PRIF-10: failed to initialize the cluster registry  Workaround: Start the Oracle Clusterware on the node    ***Notes for Windows Systems***  The syntax for changing the interfaces on Windows/RAC clusters is the same as on Unix/Linux, but the interface names will be slightly different. On Windows systems, the default names assigned to the interfaces are generally named such as:  Local Area Connection  Local Area Connection 1  Local Area Connection 2  If using an interface name that has space in it, the name must be enclosed in quotes. Also, be aware that it is case sensitive.  For example, on Windows,  to set cluster\_interconnect:  C:\oracle\product\10.2.0\crs\bin\oifcfg setif -global "Local Area Connection 1"/192.168.1.0:cluster\_interconnect  However, it is best practice on Windows to rename the interfaces to be more meaningful, such as renaming them to 'ocwpublic' and 'ocwprivate'.   If interface names are renamed after Oracle Clusterware is installed, then you will need to run 'oifcfg'  to add the new interface and delete the old one, as described above.  You can view the available interface names on each node by running the command:  oifcfg iflist -p -n  This command must be run on each node to verify the interface names are defined the same.  ***Ramifications of Changing Interface Names Using oifcfg***  For the Private interface, the database will use the interface stored in the OCR and defined as a 'cluster\_interconnect' for cache fusion traffic.  The cluster\_interconnect information is available at startup in the alert log, after the parameter listing - for example:  For pre 11.2.0.2:  Cluster communication is configured to use the following interface(s) for this instance  192.168.1.1    For 11.2.0.2+: (HAIP address will show in alert log instead of private IP)  Cluster communication is configured to use the following interface(s) for this instance    169.254.86.97  If this is incorrect, then instance is required to restart once the OCR entry is corrected. This applies to ASM instances and Database instances alike. **On Windows systems, after shutting down the instance, it is also required to stop/restart the OracleService<SID> (or OracleASMService<ASMSID> before the OCR will be re-read.**    ***Oifcfg Usage***  To see the full options of oifcfg, simply type:  $ <CRS\_HOME>/bin/oifcfg    **Case V. Add or remove cluster\_interconnect for 11gR2 and above with HAIP**  1. To add another private network into existing cluster using HAIP, as grid user:  $ oifcfg setif -global <interface>/<subnet>:cluster\_interconnect  For example:  $ oifcfg setif -global enp0s8/192.168.57.0:cluster\_interconnect   Shutdown CRS on **ALL** nodes, then restart CRS on **ALL** nodes for HAIP to pick up the new interface. It is insufficient to restart CRS in rolling manner.  2. To remove a private network from a cluster with HAIP, as grid user:  $ oifcfg delif -global <if\_name>  For example:  $ oifcfg delif -global enp0s8  HAIP will failover to the remaining interface and clusterware/database continue to function after the interface removal.  To remove the extra HAIP interface, it is required to shutdown CRS on ALL nodes, then restart CRS on ALL nodes. It is insufficient to restart CRS in rolling manner.      **Database - RAC/Scalability Community**  To discuss this topic further with Oracle experts and industry peers, we encourage you to review, join or start a discussion in the My Oracle Support [Database - RAC/Scalability Community](https://community.oracle.com/community/support/oracle_database/database_-_rac_scalability)  References  NOTE:276434.1 - How to Modify Public Network Information including VIP in Oracle Clusterware  NOTE:604958.1 - OCFS2 Node Fence Caused by Removing the External Network Cable  NOTE:1054902.1 - How to Validate Network and Name Resolution Setup for the Clusterware and RAC  NOTE:1386709.1 - The Basics of IPv4 Subnet and Oracle Clusterware | | |