

TEAM 540

Release Notes, Version 2.1.0 for HPOV - SUN Solaris

058R638-V210, Issue 3 - March 2001

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Section 1 - Solaris

1.0 Overview

These installation and release notes provide new information relevant to this version of the TEAM 540 software product. This updates the information supplied by the TEAM 540 Operation Manual. If you require additional details please refer to that manual.

Team 540 is now supported on the following Solaris platforms: Solaris 2.7 with HPOV 6.1 and Solaris 2.8 with HPOV 6.1. For additional product information and the latest updates, check the GDC website at <http://www.gdc.com> or contact your GDC field representative.

2.0 Software Reference

Throughout this manual, short forms of the software product names will be used. The following tables provide detailed reference information for all software modules relevant to TEAM 540 for Solaris installation.

Table 1: Software Reference for Solaris

Item	Part Number/Description	Version / Release
TEAM 540 Software Product	058U604-C01A	Ver 2.1.0
TEAM 540 Operation Manual	058R694-V210	Issue 1
Solaris Software Product	S-058U019-C01	Ver 2.7 / Nov 1999
	S-058U020-0001	Ver 2.8 / Feb 2000 Ver A
HPOV for Solaris Software Product	Full: 759-065S002 (Enterprise) Entry 759-065S003 (250 Node)	Ver 6.1
Solaris/HPOV Patch Clusters	Ref: Sun / HP websites	
HPOV Network Node Manager Installation Guide	HP J1136-9000	

Table 2: TEAM 540 Software Packages

Package Name	Description	Version
GDCTeam	GDC TEAM Utilities	Ver 1.1 or higher
GDCTeamSA	GDC Standalone Utilities	Ver 1.0 or higher
GDCa540	GDC Standalone TEAM 540	Ver 2.1 or higher

2.1 TEAM 540 Verification

The TEAM 540 CD contains the software packages listed in the table above. After installation is completed, these packages should be present on the system at the versions indicated in the table or greater. To verify the presence of the TEAM 540 packages currently installed type the following command:

```
/usr/bin/pkginfo -1 <PackageName>
```

3.0 Improvements Since Last Release

This is the initial release of TEAM 540 software. This software has been tested to be Year 2000 compliant in accordance to GDC ENG-STD-003. Check GDC's web site at <http://www.gdc.com> for the latest Year 2000 information. Note the following new information concerning this software:

- The application is approved for operation on SUN Solaris 2.7, Solaris 2.8, HP OpenView 6.1 and HP-UX 11.0 upgrades.

4.0 Corrected Issues

None.

5.0 HP OpenView for Solaris

The following sections describe the current requirements and procedures concerning the HP OpenView for Solaris version of TEAM 540 software.

5.1 Hardware Requirements

The current hardware requirements for TEAM 540 software is as follows:

- Minimum disk space requirements:
 /opt 60 megabytes
- The graphics card should support a resolution of 1152x900
- SUN ULTRA 5 or greater with a minimum of 96 megabytes of RAM, 2 gigabytes of hard disk space, 350 megabytes of disk space and 192 megabytes of swap space.
- CD ROM Drive

Note: *For information on hardware requirements for HP OpenView Network Node Manager products, refer to the HP OpenView Network Node Manager Products Installation Guide.*

5.2 Software Requirements

Before installing this version of TEAM 540, the following software must be installed. Refer to Table 1: Software Reference for Solaris, for detailed identification of all software products discussed below.

- Solaris Software
- HP OpenView for Solaris, Entry *or* HP OpenView for Solaris, Full

- TEAM 540 software packages

Note: *IMPORTANT - It is highly recommended that the customer download and install the latest SOLARIS PATCH CLUSTER from the following Sun web site: <http://sunsolve.sun.com>. This will ensure that you have updated the Operating System along with any current fixes to reported problems.*

Note: *IMPORTANT - It is highly recommended that the customer download and install the latest HP OPENVIEW CONSOLIDATED PATCH CLUSTER from the following HP web site: <http://ovweb.external.hp.com/cpe/patches>. This will ensure that you have updated HP OpenView along with any current fixes to reported problems.*

5.3 First Time Installation

To install the current TEAM 540 software,

1. Make sure that all users exit HP OpenView for Solaris.
2. Insert the TEAM 540 Compact Disk into the CD ROM drive.
3. At a shell prompt become super-user by entering the following command:

```
su
```

4. To stop HP Open View, type:

```
opt/OV/bin/ovstop
```

5. Start the installation process by entering the following commands:

```
cd /cdrom/cdrom0
```

6. If a version of the TEAM 540 is already resident on the workstation, or if you are not sure if it is resident, enter the following command before attempting to install the new version:

```
./remove
```

Ignore any error messages that may appear and answer **y** for the questions.

7. Continue the installation process by entering the following command:

```
./install
```

Answer **y** for the questions. The loading of software will take a few minutes.

8. Start HP Open View by typing:

```
/opt/OV/bin/ovstart
```

9. Exit super-user (type **exit**).
10. Remove the CD from the CD ROM drive.

5.3.1 Updating Common Desktop Environments

1. Open the `$HOME/.dtprofile` file with your editor and read the lengthy comments that are included in it. The comments provide information on:
 - A. how to use the C (csh), Bourne (sh), and Korn (ksh) shells in the CDE
 - B. which terminal commands should not be used because they can prevent login. When using the csh shell, the commands are generally present in `.login` and `.cshrc` files. When using the sh or ksh shells, they are in `.login` and `.profile` files.
2. After reviewing the comments, edit the `$HOME/.dtprofile` file to remove the leading pound sign(s) in the line that contains

```
### DTSOURCEPROFILE=true
```
3. If you are using C (csh) Shell you must add the following lines to `$HOME/.cshrc`:

```
source /opt/OV/bin/ov.envvars.csh
set path=($path $OV_BIN)
```
4. If you are using Bourne(sh) shell or Korn(ksh) shell you must add the following lines to `$HOME/.profile`:

```
./opt/OV/bin/ov.envvars.sh
PATH=$PATH:$OV_BIN; export PATH
```
5. The Common Desktop Environment is now updated for all users. Complete the installation by typing:

```
/opt/OV/bin/ovw &
```
6. For the changes to take effect, you must now logout and login.

5.3.2 Updating Sun OpenWindows Environments

1. If you are using C (csh) Shell you must add the following lines to `$HOME/.cshrc`:

```
source /opt/OV/bin/ov.envvars.csh
set path=($path $OV_BIN)
```
2. If you are using Bourne(sh) shell or Korn(ksh) shell you must add the following lines to `$HOME/.profile`:

```
./opt/OV/bin/ov.envvars.sh
PATH=$PATH:$OV_BIN; export PATH
```
3. The Sun OpenWindows environment is now updated for all users. Complete the installation by typing:

```
/opt/OV/bin/ovw &
```
4. You must now logout and login in order for the changes to take effect.

5.4 Installing in a Solaris Distributed Environment

A distributed environment consists of three types of workstations. Not all workstations require installation of all software, but the workstations must be set up in the following order:

- A. Collection Station
- B. Management Station
- C. Management Console

The procedures for TEAM 540 and product software installation vary depending on the type of workstation. Perform the installation and set up procedures for each workstation in your distributed environment.

5.4.1 Setting up Collection Stations

On workstations that serve as collection stations, you must install the TEAM software as described in the previous paragraphs, and then configure events so that traps are forwarded to the management station. Refer to the event data in the table below during this installation process.

Table 3: Event Forwarding Data

Enterprise Name (Enterprise ID)	Event Name (Enterprise Identifier)
gdc_540(.1.3.6.1.4.1.498.8.4)	snmp540ColdStart(.1.3.6.1.6.3.1.1.5.1)
gdc_540(.1.3.6.1.4.1.498.8.4)	snmp540WarmStart(.1.3.6.3.1.1.5.2)
gdc_540(.1.3.6.1.4.1.498.8.4)	snmpLinkDown(.1.3.6.1.6.3.1.1.5.3)
gdc_540(.1.3.6.1.4.1.498.8.4)	snmpLinkUp(.1.3.6.1.6.3.1.1.5.4)
gdc_540(.1.3.6.1.4.1.498.8.4)	snmp540Authentication(.1.3.6.1.6.3.1.1.5.5)

Note: Refer to Section 2 for detailed information on TEAM Applications in HPOV NNM Scalable and Distributed Environments. For detailed information on Event Forwarding, refer to the HP OpenView Guide to Scalability and Distribution for Network Node Manager.

1. Become a super user by typing **su** and supplying the super user password.
2. Perform the procedures for a Basic Installation as described above.
3. Start the Event system configurator GUI by typing:


```
$OV_BIN/xnmtrap
```
4. From the Enterprise Identification panel, select an Enterprise Name
for example: **gdc_cmnAlarm**
5. From the Event Identification panel, select an Event Name
for example: **dmscmnAlarmTrap**
6. From the Event Configuration window menu bar, select **Edit->Modify Event**. The Event Configurator/Modify Event dialog box appears.

7. Click on the Forward Event check box to expand the dialog box. The Forwarded Event Destinations pane displays.
8. Type the hostname or IP Address for destination. Destinations are the managements stations to which events will be forwarded.
9. Repeat steps 5 through 9 for each of the events listed in Table 3.
10. When all events are forwarded, click **OK** in the Event Configurator/Modify Event dialog box.
11. At the Event Configuration window, click **File->Save** to save the changes.
12. To cause Openview processes to re-read the trapd.conf file, generate Event by typing:

```
$OV_BIN/xnmtrap -event
```

5.4.2 Installing TEAM Applications on the Management Station

To install TEAM 540 on the Management Station, perform the following steps:

1. Make sure all users exit HP OpenView for Solaris.
2. To install TEAM 540, insert the TEAM 540 CD into the CD ROM drive.
3. At the shell prompt, become super user by typing

```
su
```
4. Check / to make sure there is a /**cdrom** directory already present. If not, create it.
5. Stop HP OpenView processes by typing

```
/opt/OV/bin/ovstop
```
6. Start the installation process by typing:

```
cd /cdrom/cdrom0
```
7. If a version of the TEAM 540 is already resident on the workstation, or if you are not sure if it is resident, enter the following command before attempting to install the new version:

```
./remove
```

Ignore any error messages that may appear on the monitor and answer **y** for the questions.
8. Continue the installation process by entering the following command:

```
./install
```
9. Answer **Y** to the questions.
10. When installation is complete, start HP OpenView processes by typing:

```
/opt/OV/bin/ovstart
```
11. Type **cd /**
12. Type **eject**
13. Exit super user by typing **exit**. Remove the CD from the CD ROM drive.

5.4.3 Setting Up the Management Station

1. At the shell prompt, become super user by typing


```
su
```
2. Type the following commands:


```
/opt/OV/bin/ovstop
/etc/init.d/nfs.client stop
/etc/init.d/nfs.server start
```
3. To ensure the NFS server daemon process **nfsd** is running, type the following command and verify the results:


```
ps -ef | grep nfsd
```
4. To add all Management Consoles to the management station, edit the **/etc/hosts** file by typing each Console's specific IP address and Hostname on a separate line, as shown in the example:


```
###.###.###.### Console_Hostname
###.###.###.### Console_Hostname
```
5. Save and close the **/etc/hosts** file.

Note: *If using vi editor, use **wq!** to save and close the file.*

6. For the Management Console system to share the management station directories over NFS, edit **/etc/dfs/dfstab** file as follows:


```
share -F nfs -o root=Console_Hostname /etc/opt/OV/share
share -F nfs -o root=Console_Hostname /var/opt/OV/share
share -F nfs -o root=Console_Hostname /usr/tmp
```
7. Save and close the **/etc/dfs/dfstab** file.
8. To share the Management Station directories with the Consoles over NFS, type:


```
share -F nfs -o root=Console_Hostname /etc/opt/OV/share
share -F nfs -o root=Console_Hostname /var/opt/OV/share
share -F nfs -o root=Console_Hostname /usr/tmp
```
9. Edit the **/etc/opt/OV/share/conf/ovwdb.auth** file as shown below to add an entry for the Console, as shown in the example:


```
Console_Hostname +
```
10. Edit the **/etc/opt/OV/share/conf/ovw.auth** file as shown below to add an entry for the Console, as shown in the example:


```
Console_Hostname +
```

Note: *Repeat step 6 through step10 using the specific hostname for each additional Management Console in the system.*

11. Type the following command to restart nfs server.

```
/etc/init.d/nfs.server stop  
/etc/init.d/nfs.server start
```

12. To start HP Openview processes, type:

```
/opt/OV/bin/ovstart
```

13. Exit super user by typing **exit**.

14. Complete the setup by typing:

```
/opt/OV/bin/ovw &
```

5.4.4 Installing TEAM Applications on Management Consoles

To install TEAM 540 on Management Consoles, perform the following steps:

1. Make sure all users exit HP OpenView for Solaris.
2. On the Management Console, become a super user by typing:

```
su
```

If the Solaris distributed environment has been set up, perform steps 3- 7. Otherwise, skip to step 8.

3. Disconnect as a HP OpenView client by running:

```
/opt/OV/bin/ovwsetupclient -u
```

4. Open the file `/etc/vfstab` and type a **#** in the beginning of each line to comment them out. Save and close the file.

5. On the Management Station, become a super user and open the `/etc/dfs/dfstab` file. Comment out each line which contains the Console hostname by typing a **#** in the beginning of each line.

6. Save and close the `/etc/dfs/dfstab` file.

7. On the Management Console become a super user and enter the following commands:

```
/etc/umount Station_Hostname:/etc/opt/OV/share  
/etc/umount Station_Hostname:/var/opt/OV/share  
/etc/umount Station_Hostname:/usr/tmp
```

8. Check `/` to make sure there is a `/cdrom` directory already present. If not, create it.

9. Stop HP OpenView processes by typing

```
/opt/OV/bin/ovstop
```

10. Insert the TEAM 540 Compact Disk into the CD ROM drive.

11. Start the installation process by typing:

```
cd /cdrom/cdrom0
```

12. If a version of the TEAM 540 is already resident on the workstation, or if you are not sure if it is resident, enter the following command before attempting to install the new version:

```
./remove
```

Ignore any error messages that may appear on the monitor and answer **y** for the questions.

13. Continue the installation process by entering the following command:

```
./install.sh
```

14. Answer **Y** to the questions.

15. When installation is complete, start HP OpenView processes by typing:

```
/opt/OV/bin/ovstart
```

16. Type **cd /**

17. Type **eject**

18. Exit super user by typing **exit**. Remove the CD from the CD ROM drive.

Perform steps 19 - 25 only if the Solaris distributed environment has been set up. Otherwise, skip to step 26.

19. On the Management Station become a super user by typing:

```
su
```

20. Open the **/etc/dfs/dfstab** file. Remove the **#** in the beginning of each line which contains the Console hostname.

21. Type the following commands:

```
share -F nfs -o root=Console_Host_Name /etc/opt/OV/share
share -F nfs -o root=Console_Host_Name /var/opt/OV/share
share -F nfs -o root=Console_Host_Name /usr/tmp
```

Note: You will now mount **/usr/tmp** on the client from the server over *nfs*, since the TEAM Shelf Discovery process stores the discovered shelf GUI images (gif files) in */usr/tmp*.

22. On the Management Console become a super user by typing

```
su
```

23. Open the file **/etc/vfstab** and restore each line by deleting the **#** in the beginning of each line.

24. Save and close the file.

25. Type the following commands:

```
/etc/mount Station_Hostname:/etc/opt/OV/share
/etc/mount Station_Hostname:/var/opt/OV/share
/etc/mount Station_Hostname:/usr/tmp
/opt/OV/bin/ovwsetupclient /opt/OV/nfs/Station_Hostname
```

Note: *The path may be different if automounter was used.*

26. Exit super user and become a normal user. On the management console, bring up the OpenView windows using the server database by typing:

```
/opt/OV/bin/ovw &
```

5.4.5 Setting Up the Management Console

1. At the shell prompt, become super user by typing

```
su
```

2. Type the following commands

```
/opt/OV/bin/ovstop  
/etc/init.d/nfs.server stop  
/etc/init.d/nfs.client start
```

3. To ensure that the NFS client daemon processes (statd and lockd) are running, type the following command and verify its results:

```
ps -ef | grep statd  
ps -ef | grep lockd
```

4. To add the Management Station to the Management Console, edit the `/etc/hosts` file by typing the Management Station's specific IP address and Hostname, as shown in the example:

```
###.###.###.###    Station_Hostname
```

5. Save and close the `/etc/hosts` file.

6. Type the following commands:

```
mkdir -p /opt/OV/nfs/Station_Hostname/etc/opt/OV/share  
mkdir -p /opt/OV/nfs/Station_Hostname/var/opt/OV/share  
rmdir /usr/tmp  
mkdir -p /usr/tmp  
chmod 777 /usr/tmp
```

7. To mount the Management Station directories on this Console over NFS, edit the `/etc/vfstab` file as shown in the example:

```
Station_Hostname:/etc/opt/OV/share - /opt/OV/nfs/Station_Hostname/etc/opt/OV/share/ nfs - yes rw  
Station_Hostname:/var/opt/OV/share - /opt/OV/nfs/Station_Hostname/var/opt/OV/share/ nfs - yes rw  
Station_Hostname:/usr/tmp - /usr/tmp nfs - yes rw
```

8. Save and close the `/etc/vfstab` file.

- To mount the Management Station directories on this Console over NFS, type the following commands:

```
/etc/mount Station_Hostname:/etc/opt/OV/share  
/etc/mount Station_Hostname:/var/opt/OV/share  
/etc/mount Station_Hostname:/usr/tmp
```

- Type the following commands to restart nfs client

```
/etc/init.d/nfs.client stop  
/etc/init.d/nfs.client start
```

- Set up the Management Console by typing:

```
/opt/OV/bin/ovwsetupclient /opt/OV/nfs/Station_Hostname
```

- Exit Super User by typing **exit**.

- Complete the setup by typing:

```
/opt/OV/bin/ovw &
```

Note: *It is not necessary to start HP OpenView daemons using /opt/OV/bin/ovstart on the Management Console because the Console shares the same HP OpenView database present on the Management Station over NFS.*

Note: *If the Console OpenView windows does not start up properly, reboot the Management Station and wait until it is UP completely. Then, reboot the Console.*

5.5 Post-Installation Procedure For All Solaris Environments

Once the TEAM 540 software has been installed in the desired environment, the following procedure must be performed to enable IP Discovery.

- After completing installation and environment setup, open the root map.
- At the Options menu, select **Network Polling Configuration: IP**.
- At the Configuration Area, select **IP Discovery**.
- Enable the **Discover New IP Nodes** option by selecting its checkbox.
- Click **OK**. Discovery will begin at once and the Universe map will start to show the discovered shelves.

6.0 De-Installation

To remove TEAM 540 software:

- Make sure that all users exit HP OpenView for Solaris.
- Insert the TEAM 540 Compact Disk into the CD ROM drive.
- At a shell prompt, become super-user.
- To stop HPOpen View, type:

```
/opt/OV/bin/ovstop
```

5. Start the removal process by entering the following command:

```
cd /cdrom/cdrom0/solaris
./remove.sh
```
6. To start all HP Open View, type

```
/opt/OV/bin/ovstart
```
7. Exit super-user (type **exit**).
8. Remove the CD from the CD ROM drive.

6.1 De-Installing a Distributed Environment

De-installation of TEAM software in a distributed Solaris environment should be performed in the following order:

- A. Management Console
- B. Management Station
- C. Collection Station

6.1.1 De-Installing the Management Console

To remove TEAM 540 or any other TEAM product software from a management console, perform the following steps:

Note: *If the Solaris distributed environment has been set up, it must be disabled temporarily to avoid sharing conflicts with the server. Additional steps for this are provided below.*

1. Make sure that all users exit HP OpenView for Solaris.
2. At the shell prompt, become super user by typing:

```
su
```
3. Disconnect as a HP OpenView client by running:

```
/opt/OV/bin/ovwsetupclient -u
```
4. Stop the HP OpenView processes by typing:

```
opt/OV/bin/ovstop
```
5. Open the file `/etc/vfstab` and type a **#** in the beginning of each line.
6. Save and close the `/etc/vfstab` file.
7. On the Management Station, become a super user and open the `/etc/dfs/dfstab` file. Comment out each line which contains this Console by typing a **#** in the beginning of that line.
8. Save and close the `/etc/dfs/dfstab` file.
9. On the Management Console, become a super user and enter the following commands:

```
/etc/umount Station_Hostname:/etc/opt/OV/share
/etc/umount Station_Hostname:/var/opt/OV/share
/etc/umount Station_Hostname:/usr/tmp
```


10. Begin the removal process by entering the following command:


```
cd /cdrom/cdrom0
./remove
```
11. Insert the TEAM 540 CD into the CD ROM drive.
12. Restart all HP OpenView processes by typing:


```
opt/OV/bin/ovstart
```
13. Type `cd /`
14. Type `eject`
15. Remove the CD from the CD ROM drive.
16. Open the `/etc/vfstab` file and remove the `#` from the beginning of each line that contains a Console hostname.
17. On the Management Station, become a super user by typing:


```
su
```
18. Open the `/etc/dfs/dfstab` file and remove the `#` from any lines which contain this Console's name.
19. Type the following commands:


```
share -F nfs -o root=Console_Hostname /etc/opt/OV/share
share -F nfs -o root=Console_Hostname /var/opt/OV/share
share -F nfs -o root=Console_Hostname /usr/tmp
```
20. Exit super user by typing `exit`.
21. On the Management Console, become a super user by typing `su` and supplying the super user password.
22. Attach the NFS mounts to the management console, execute the following commands, using the management station's host name:


```
/etc/mount Station_Hostname:/var/opt/OV/share
/etc/mount Station_Hostname:/etc/opt/OV/share
/etc/mount Station_Hostname:/usr/tmp
```
23. Exit super user login.

6.1.2 De-Installing the Management and Collection Stations

1. In the OpenView Root map, click on the Standalone universe icon.
2. From the Edit menu of the Root map menu bar, select **Delete**, then select **From All Submaps** to remove the Standalone icon from the Root map.
3. Make sure that all users exit HP OpenView for Solaris.
4. Insert the TEAM 540 CD into the CD ROM drive.
5. At the shell prompt, become super user by typing:


```
su
```
6. Stop the HP OpenView processes by typing:


```
opt/OV/bin/ovstop
```

7. Begin the removal process by entering the following command:

```
cd /cdrom/cdrom0  
./remove
```

8. Restart all HP OpenView processes by typing:

```
opt/OV/bin/ovstart
```

9. Type `cd /`
10. Type `eject`
11. Exit super user by typing `exit`.
12. Remove the CD from the CD ROM drive.

6.2 Re-Installation

To re-install TEAM 540 software, it is necessary to first perform all the steps in the De-installation procedure. This removes all TEAM 540 packages. You can then repeat the steps of the Installation Procedure described earlier in this chapter. You will not need to repeat the user environment update procedure.

7.0 Known Issues

- The keyboard **Num Lock** or **Caps Lock** key, if pressed ON will make the mouse buttons and the scroll bars inoperable.
- In some TEAM application windows, slight text misalignments may appear. These do not affect the usability or operation of the application.
- Some TEAM applications may display meaningless characters in the application window headings. This is due to a font conflict which can be resolved by typing the following on the command line *before* running `ovw`:

```
xrdb -merge /opt/OV/bin/gdc_load_resources
```

8.0 Operating Guidelines

- Because the read-only maps are not automatically updated, use Map -> Refresh Map to update the maps.
- After an installation of the TEAM software or a reboot of the system, TEAM applications may take up to one minute to start up, due to the loading of the shared libraries.
- After an installation of TEAM software, the user must enable **Discover New IP Nodes** from the root map Options menu in order for shelf discovery to occur.

Section 2 - TEAM Applications and HP OpenView NNM Scalable and Distributed Environments

1.0 Overview

This section briefly discusses the Scalability and Distribution features in NNM and how to integrate/install TEAM applications in a Scalable and Distributed environment. Refer to the HP OpenView Manual, "A Guide to Scalability and Distribution for NNM" for more detailed understanding and concepts.

1.1 Features and Advantages

The Scalable and Distribution features of the HP OpenView NNM provide robust performance over a wide range of network sizes and degrees of complexity.

The Scalable feature gives NNM the potential for handling networks of different sizes in both LAN and WAN environments. To make NNM scalable, the network management work load must be distributed to multiple systems. Then, the Distribution feature improves performance of NNM in large networks by reducing the amount of management traffic over network resources.

Some of the advantages of these NNM features are:

- The Scalable feature of NNM makes it easier to adapt network management for handling new networking landscapes.
- The Distribution feature minimizes the amount of network management traffic. Without this capability, it would be impractical to monitor thousands of nodes from a single workstation.
- Faster response times and better performance as work load is distributed to multiple workstations.
- Shared responsibilities reduces the risk of losing network management data in the event of an unexpected shutdown of the management station.
- One Common network management database (in most cases) for all users, so that modifications of managed nodes would be reflected across the board.

Some drawbacks/trade-offs are:

- Distribution of tasks requires an increased number of computing resources.
- Scalable and distributed environment requires added complexity in setup.

1.2 Theory of Operation

In a Stand-alone environment, all network management tasks are done on a single workstation. In a Distributed environment tasks are handled by multiple workstations: Collection Station (CS), Management Station (MS), Management Console (MC). Depending on network size, structure, geography and trends, one of four deployment models should be chosen: Fully centralized, Centralized hierarchical, Hierarchical, or Co-operative independent.

- Figure 1 demonstrates a Centralized hierarchical model. Refer to the HP OpenView manual for examples of other models and for choosing the model for your needs.
- Figure 2 demonstrates the HP OpenView and TEAM processes and applications that run on the collection station, the management station, and the management console.

1.2.1 The Collection Station

A collection station discovers nodes and forwards this information to the management station. The collection station also monitors (the netmon process) the nodes in its domain and forwards any traps it receives from the managed node (IP device) to the management station. Depending on the number of managed nodes and network structure, there could be more than one collection station. The collection and management stations periodically synchronize node and topology information. Figure 1 shows two collection stations feeding node and topology information to the management station.

1.2.2 The Management Station

The management station processes the node and topology information it receives from the collection stations and stores the information (via ovwdb) in a database. The management station also receives from collection stations the trap information for various managed nodes (ovtrapd process) and stores it. There should only be one management station in a distributed setup so that the node information can be shared by all the users on various management consoles.

1.2.3 The Management Console

The management console is where all the user processes are executed. User interface (application) processes like ovw, xnmevents, xnmsnmpconf are executed here in order to manage the nodes in the management station's database. The Management Consoles should be connected to the Management Station using an Ethernet LAN or a high speed network matching the speeds of LAN. Management Station and the Management Consoles will share the same database by mounting the database over the Network Filing System (NFS).

1.2.4 Permissions

The first network operator to run ovw and launch OpenView screens will have read/write permissions to the database. The rest of the operators will get read-only permissions. Note that read-only screens do not synchronize automatically with changes in network topology or with the addition or deletion of devices to the database. To resynchronize the entire network map, network operators on the management console must manually perform a **Map -> Refresh Map** command. All network operators will be able to perform other TEAM Network Management operations, such as Configuration, Provisioning, Diagnostics. Operators must manage a unit in the shelf from only one workstation at a time.

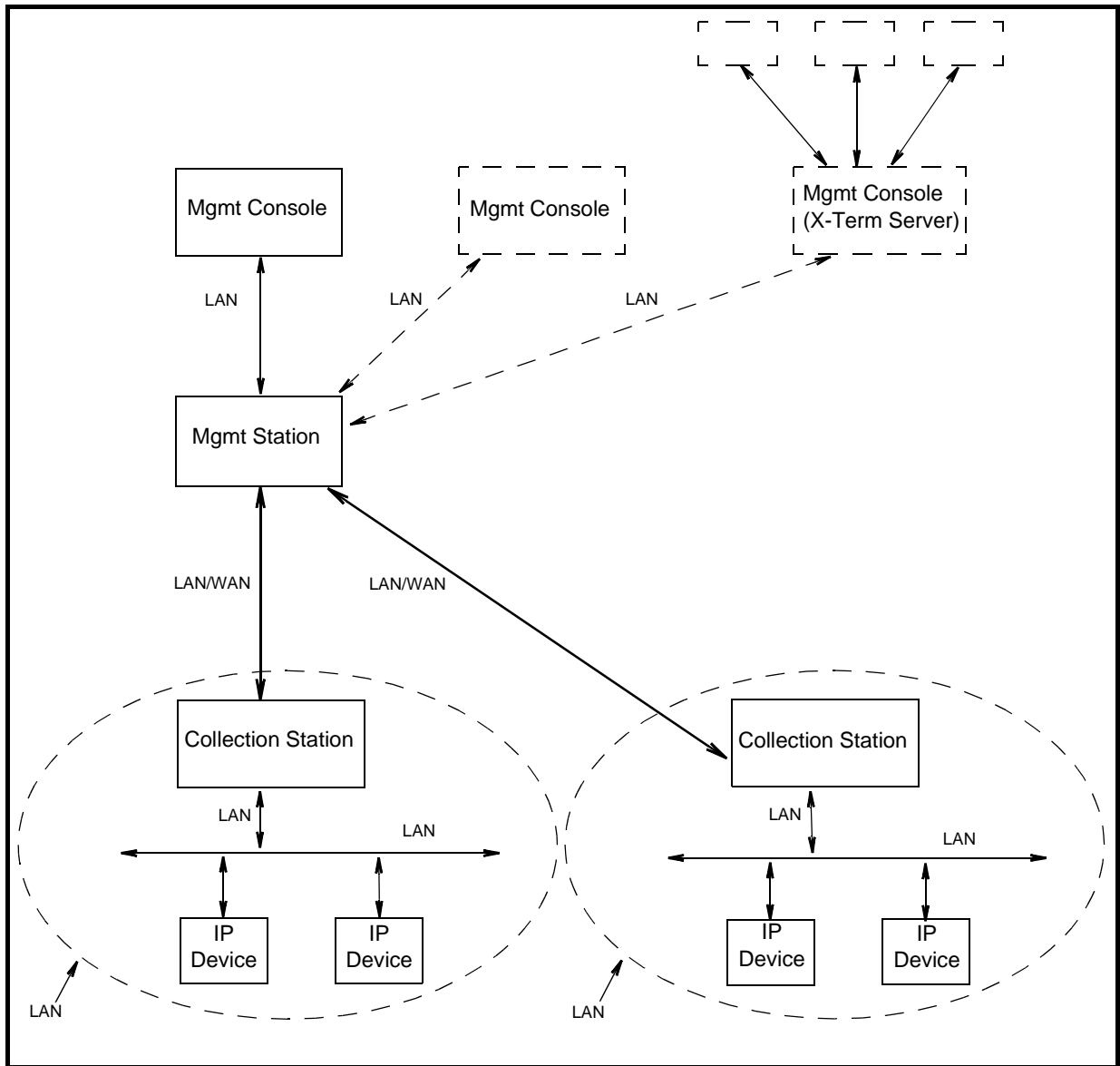


Figure 1: Example of the Centralized Hierarchical Model

1.3 The Distribution of Processes and Applications

The sequence of events that occur end-to-end from the IP node to the management console (Figures 1 and 2) is as follows:

Collection Station(s)

1. **netmon** process begins IP discovery, and populates the local topology database(**ovtopmdb**) with the help of **ovtopmd** process.
2. After the completion of discovery, the topology information is accessible by the management station.

Management Station

3. The management station requests the collection station(s) for topology information via **ovrepld** process.
4. Upon obtaining the topology information (from all collection stations), the management station merges the data into its topology database.
5. Using the data in the topology database, the processes in the management station communicate with each node to update other information necessary to manage the node.
6. Periodically, the **ovrepld** processes on the collection station(s) and management station synchronize the topology data. Once synchronization is complete, only changes in status and topology get sent to the management station.

Management Console and Management Console X Term Server

7. After the management station is ready with node information, the **ovw** process can be run.
8. Once **ovw** is up and running, network management on various nodes can be done.

Note: *When one of the management consoles is also designated as a X-Term Server, X-Terminals (such as Tektronics Graphics terminal) could be setup to display **ovw** sessions on these terminals. The **ovw** sessions are actually executed on the management console but displayed on the X-Terminals.*

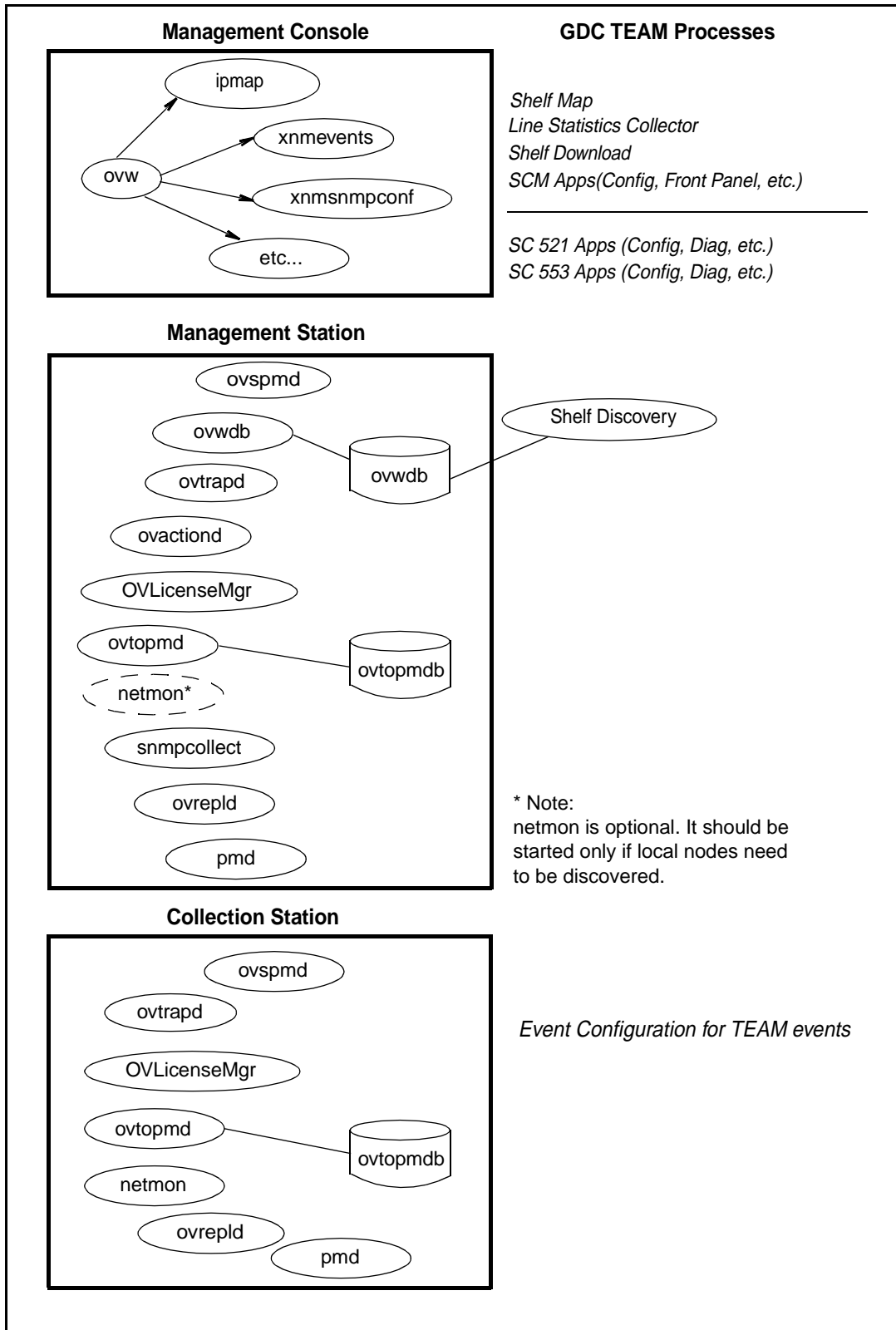


Figure 2: HP OpenView and Team Processes and Applications

2.0 Integrating the TEAM Application in a Distributed Environment

Due to distribution of tasks in a distributed environment, TEAM software products must be installed on the collection station, the management station and the management console in the precise order as described in Sections 2 and 3 of these TEAM Core Release Notes. The following sections describe the dependency tree, discovery, and event handling of GDC devices for TEAM software products.

2.1 TEAM Software Product Dependency

To manage any GDC product using TEAM software, multiple software products are required. Figure 3 shows the dependencies among various products. In the example, the SC521 and SC553 cards along with their associated packages are being managed by TEAM521 and TEAM553. Both TEAM products are dependent upon TEAM Core. Because of this product dependency, TEAM Core must be installed on the workstation *before* installing TEAMSC521, etc.

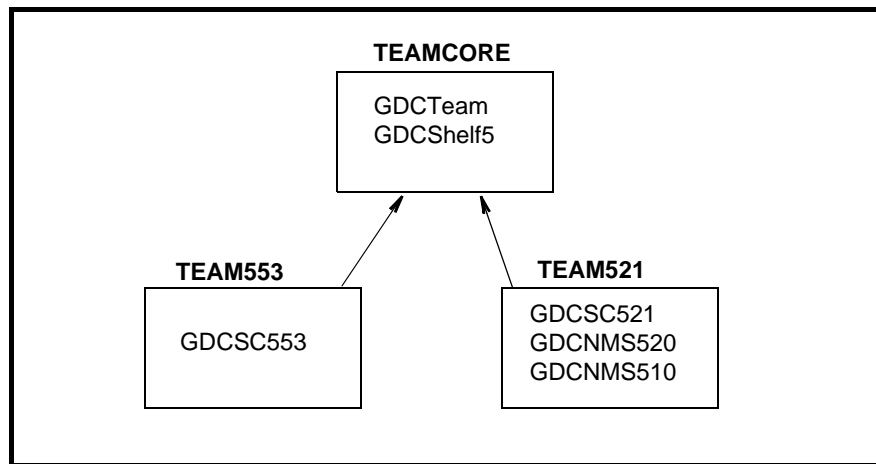


Figure 3: TEAM Software Product Dependencies

2.2 Discovery in an HP OpenView Distributed Environment

Once TEAM software is installed and configured in an HP OpenView NNM distributed environment, the system is ready for network management of GDC devices. This begins with the discovery of a GDC device on the management console where it is managed. Some of the typical applications that are executed on the management console are shown in Figure 2. The sequence of events that occur end-to-end is as follows:

1. A GDC device is discovered by a collection station and gets stored in its topology database.
2. This discovery information is requested by the management station in a synchronization cycle of **ovrepld** process.
3. The management station adds the device into its database as a new node.
4. Once a new node gets added on the management station, the **shelf_discovery** gets notified of the change.
5. The **shelf_discovery** process communicates with the SCM to get the shelf contents and other relevant information and stores the information.
6. After a GDC shelf is discovered, a new shelf gets added to the TEAM universe submap.
7. From this submap various GDC devices can be managed.

2.3 Event Handling

A trap generated from a GDC device arrives at the management console where it is updated. The sequence of events that occur end-to-end is as follows:

- A. When SCM is set up to do so, a GDC device sends a trap to the collection station.
- B. The collection station then forwards the trap to the management station, where it gets processed by **shelf_discovery** process and notifies the shelfmap process on the management console.
- C. The shelfmap process updates the status of the device associated with the event. Note that one process runs for every ovw session.

