

# Installing, Configuring and Using the TimesTen Scaleout VM

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## **Overview**

This VirtualBox VM was created for the purpose of demonstrating TimesTen Scaleout. The VM includes everything needed to use several different configurations of a Scaleout database, load data into the database and run the TimesTen Scaleout sample programs.

The VM can also be used for basic training purposes as it includes the TimesTen Scaleout Hands-On Lab. If you only want to use the Hands on Lab then you should:

- a) Read the **Pre-requisites** section and ensure that all of the requirements are met.
- b) Follow the Importing the VM section under **Installation and Configuration**.
- c) Skip to the TimesTen Scaleout Hands on Lab section at the end of **Using the TimesTen Scaleout VM**.

Two similar but distinct VM / network configurations are supported. The rest of this document describes the supported VM configurations and explains how to install and configure them; a small amount of manual configuration is needed within VirtualBox for each of the configurations (full instructions are provided below).

For those interested in the deeper technical details, these can be found in the various appendices; the main body of this document focuses on the 'how' rather than the 'why'.

## **Pre-requisites**

A host system with at least 2 physical CPU cores (4 physical cores are recommended), at least 12 GB RAM (16 GB is recommended) and at least 64 GB free disk space. Placing the Virtual Machine files on SSD or flash storage is recommended for best performance.

As initially imported, the VM is configured to use 2 CPU cores and 8 GB RAM. If your host is above the minimum spec then you can potentially increase the CPU and/or memory allocation for the VM, which will improve its performance.

The host OS must be one of 64-bit Windows 7 Professional or later, Mac OS X 10.12 or later or Oracle/RedHat Linux 6 64-bit or later.

VirtualBox 6.0 or later for your host OS must be installed and functional. Using the latest available version of VirtualBox is strongly recommended. Installation of the VirtualBox Extension Pack is also strongly recommended. If you are using a newer version of VirtualBox than that used to create the VM image (6.0.4) then after importing the VM image to create your VM you should update the VirtualBox guest additions within the VM.

## Supported VM Configurations

There are 2 supported operating configurations:

### **Basic - two 'internal' networks**

Everything runs within the VM. All user activity occurs within the VM. There is no connectivity between the VM and the outside world. All access to the VM is via the VM's Linux OS GUI console.

### **Enhanced - one 'internal and one 'host only' network**

Similar to the previous configuration except that access to the VM's Linux OS is also possible from the machine hosting the VM. This means you can run SSH sessions, TimesTen client sessions and SQL Developer on the host machine to access the TimesTen Scaleout database running within the VM.

Even in this configuration the VM's Linux OS does not have access to any external network.

The default configuration for the VM as imported is **Basic**.

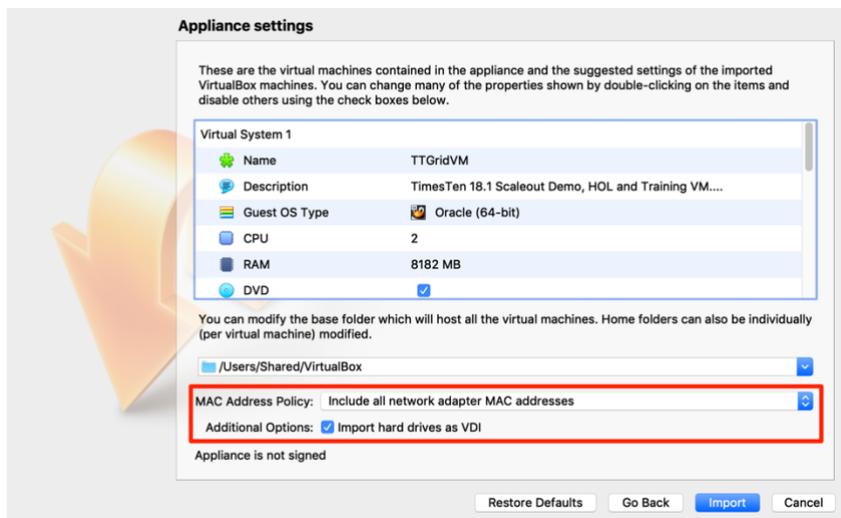
## Installation and Configuration

### Importing the VM

Both configurations are supported via a single unified VM image (TTGridVM.ova).

First, you need to import the OVA file to create the virtual machine. Use the VirtualBox **File / Import Appliance...** menu option.

**IMPORTANT:** When importing the image be sure to select **Include all network adapter MAC addresses** and also to check the box under **Additional Options:** labelled **Import hard drives as VDI** (see screenshot below). If you make a mistake with either of these options, delete the imported VM and re-import it using the correct settings.

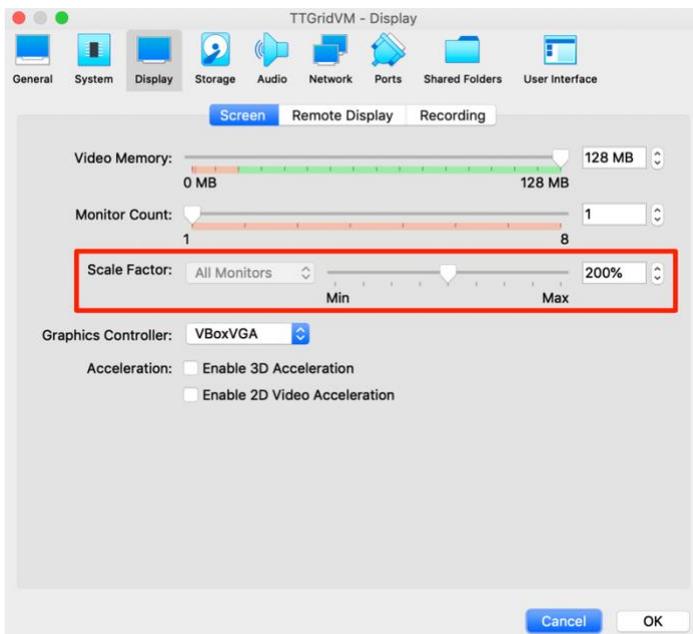


After importing the image, and before starting it for the first time, some simple configuration actions may need to be performed within the VirtualBox GUI, depending on the desired configuration (see below).

Both configurations use VirtualBox 'internal' networking, which doesn't need any explicit configuration, while the Enhanced configuration requires explicit configuration of a VirtualBox 'host only' adapter within VirtualBox.

### Check and adjust the display scaling factor

The VM is configured with a display resolution of 1280x720 and by default uses a display **Scale Factor** of **200%** which gives good results on modern HiDPI displays when the OS scale factor is set to 100%. If you have a non HiDPI display (or if you are using a custom display scaling setting in the OS) then you will likely need to change the VirtualBox VM **Scale Factor** to some other value (most likely in the range **100% to 150%**). You do this in the VM settings on the **Display** tab as follows:



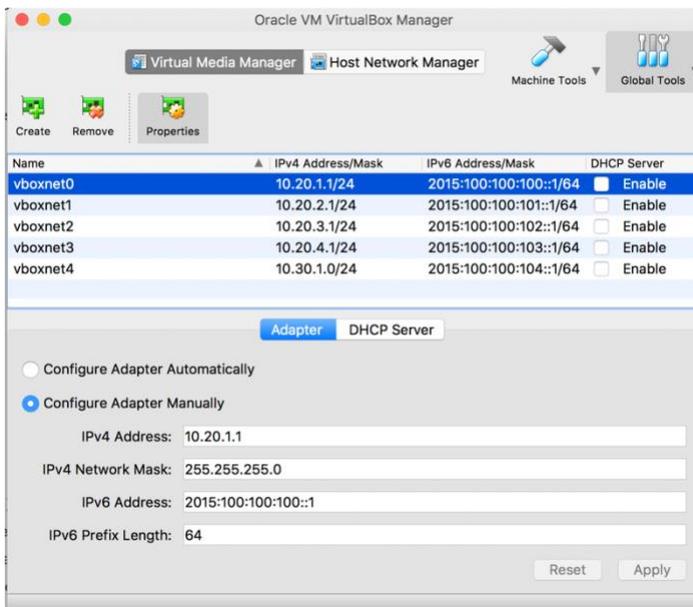
You can also change the Scale Factor (and the VM display resolution) once the VM has booted and you have logged in by using the VirtualBox VM menu option **View / Virtual Screen 1**.

### Optional: Creating the host-only network for the 'enhanced' configuration

You can use an existing host-only network if you have one configured provided that its settings meet the criteria detailed below. Alternatively, you can create a new host-only network. The instructions here cover creating a new network (strongly recommended).

**NOTE:** The GUI screenshots in this document were taken on a Mac system. The appearance may differ on other platforms.

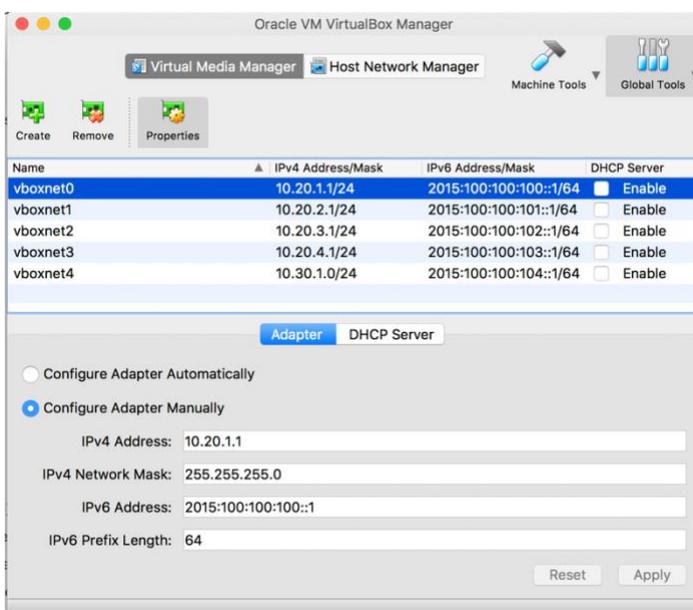
Start **VirtualBox** and from the menu choose **File / Host Network Manager...** to enter the utility for managing Host-only networks. You should see something similar to the following window (depending on whether you already have some Host-only networks defined).



Click the  icon to add a new **Host-only** network. Alternatively, you may choose to re-configure an existing Host-only network (this will impact any other VMs you have that use that Host-only network) by clicking on it to select it.

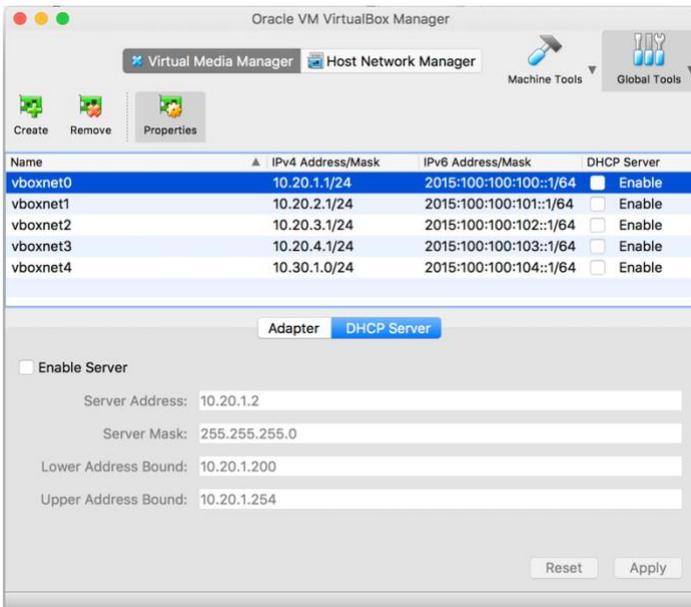
**NOTE:** The pre-packaged Demo VM expects to be using the Host-only network called **vboxnet0**. If you decide to use a different network then you will need to modify the Host-only network selection for the VM's Adapter 2 setting accordingly – see later.

With the (possibly newly created) network selected, click on the **Adapter** tab. Set the values as shown:



**NOTE:** If you already have a host-only network using this address (10.20.1.1 / 255.255.255.0) then you should use that network rather than trying to create a new one since having multiple networks with the same address range is not recommended.

Then click on the **DHCP** tab and ensure that the DHCP server is not enabled:



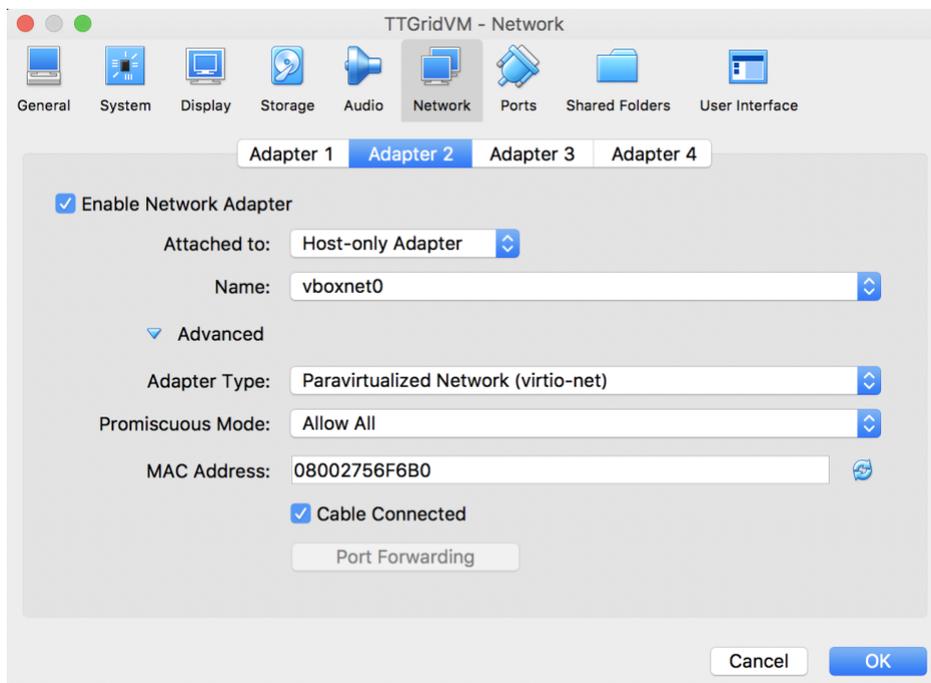
Click **OK** to complete the setup of the host-only network.

### Optional: Configuring the VM Adapter settings for the 'enhanced' configuration

In the **VirtualBox GUI**, select the **TTGridVM** VM and then click the **Settings** icon in the toolbar to open the settings dialogue for the VM.

Click on the **Network** icon then on the **Adapter 2** tab and finally click on the 'expand' arrow next to **Advanced**.

Ensure that all settings are exactly as shown here, other than the host-only network name which should be the one you selected in the previous setup step:



Click **OK** to apply the VM settings.

## Optional: Configuring the Host OS to enable access to the VM

If you are using enhanced mode, the host OS needs to be able to resolve the following hostnames:

### **ttgridvm-pub**

### **ttgridvm-pub.oracle.net**

to the VM's IPv4 network address (10.20.1.51) and (optionally) to its IPv6 address (if the host has IPv6 networking configured and if you wish to use it for Host <-> VM communication). This is accomplished differently depending on the host OS.

#### Windows Host

As an Administrator user, open the file **C:\Windows\System32\drivers\etc\hosts** in a text editor (Notepad is fine).

Add the following lines at the end:

```
10.20.1.51          ttgridvm-pub ttgridvm-pub.oracle.net
2015:100:100:100::51  ttgridvm-pub ttgridvm-pub.oracle.net
```

Save the file.

#### Linux or macOS host

As 'root' (i.e. using 'sudo') open the file **/etc/hosts** using a text editor (e.g. vi) and add the following lines at the end:

```
10.20.1.51          ttgridvm-pub ttgridvm-pub.oracle.net
2015:100:100:100::51  ttgridvm-pub ttgridvm-pub.oracle.net
```

Save the file.

## Optional: Testing Host -> VM connectivity for enhanced mode

Start the TTGridVM VM. When it has completed startup and the login screen is displayed, open a command line session on your host (cmd.exe on Windows, a Terminal session on Linux or macOS). Enter the following commands and check that connectivity is functional:

```
$ ping ttgridvm-pub
PING ttgridvm-pub (10.20.1.51): 56 data bytes
64 bytes from 10.20.1.51: icmp_seq=0 ttl=64 time=0.688 ms
64 bytes from 10.20.1.51: icmp_seq=1 ttl=64 time=0.572 ms
64 bytes from 10.20.1.51: icmp_seq=2 ttl=64 time=0.411 ms
64 bytes from 10.20.1.51: icmp_seq=3 ttl=64 time=0.537 ms
^C
--- ttgridvm-pub ping statistics ---
4 packets transmitted, 4 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 0.411/0.552/0.688/0.099 ms

$ ping ttgridvm-pub.oracle.net
PING ttgridvm-pub (10.20.1.51): 56 data bytes
64 bytes from 10.20.1.51: icmp_seq=0 ttl=64 time=0.688 ms
64 bytes from 10.20.1.51: icmp_seq=1 ttl=64 time=0.572 ms
64 bytes from 10.20.1.51: icmp_seq=2 ttl=64 time=0.411 ms
```

```
64 bytes from 10.20.1.51: icmp_seq=3 ttl=64 time=0.537 ms
^C
--- ttgridvm-pub ping statistics ---
4 packets transmitted, 4 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 0.411/0.552/0.688/0.099 ms
```

**NOTE:** You will need to hit Ctrl-C to interrupt the ping command.

### Optional: Changing the configuration of an existing VM

It is possible to change the configuration of an existing VM without reimporting it. The procedure for doing this is as follows:

1. Shut down the VM.
2. If you want to configure for enhanced mode and you have not previously used it then perform the necessary configuration steps as described in the previous sections. Switching to basic mode does not require any specific pre-configuration.
3. Check/modify the VirtualBox configuration for network adapter **2**. It should be exactly as shown in the previous section but with the correct network adapter type and name selected.

For basic mode:            Internal network / intnet2

For enhanced mode:      Host-only Adapter / vboxnetN (select the one that you configured)

4. Start the VM.

## Using the TimesTen Scaleout VM

### Getting Started

**NOTE:** As this is a single VM, the ZooKeeper servers, all of the TimesTen Scaleout instances and the Scaleout repository are deployed within the same system. This is a supported configuration and can be useful for development and test purposes but this configuration is not recommended for production deployments.

Login to the VM as **oracle/oracle**. All activities within the VM are performed as the **oracle** user, which also has sudo capability without requiring any password to be entered.

After logging into the VM as **oracle** you will see desktop icons to (a) start SQL Developer (a connection to the grid database is pre-configured), (b) start a Terminal session, (c) open this README file and (d) open the Hands-on Lab Instructions.

The filesystem layout of the VM's Linux OS includes the following directories:

**/home/oracle** – oracle user's home directory. Various utilities are on the 'bin' sub-directory plus the TimesTen Scaleout samples are in the 'oracle-timesten-samples' directory.

**/grid/zk** – the ZooKeeper server installation.

**/grid/sw** - the TimesTen software installation

**/grid/bin** – various convenience utilities

**/grid/data** – sample data for the Scaleout sample schema and programs

**/grid/repos** – grid repositories

**/grid/config** – configuration files, templates etc. used by the automated deployment tools and for manual deployment. The environment variable **DEMOHOME** is pre-set to this directory for convenience and when you log into the VM and open a terminal session you will start off in this directory.

**/grid/inst/mgmtinst** - the TimesTen grid management instance home

**/grid/inst/datainstn** - up to 8 TimesTen grid data instance homes, numbered 1 to 8, depending on the grid configuration being used.

**/grid/inst/clntinst** – a TimesTen client instance configured for access to the grid database

**/grid/db/datainstn** – database files for the instances.

### Deploying a grid, creating and populating the sample database

We will deploy a 6 instance grid with k=2 (i.e. a 3x2 grid), create a database that is distributed across all of the replica sets and populate it with a sample data set consisting of just over 200,000 rows.

- a) To (re)build the grid and populate the demo database with the 100k customer data set:

**NOTE:** This will automatically tear down any pre-existing grid of any number of instances.

We will use the 'grid\_create' convenience script.

```
[oracle@ttgridvm xxx]$ cd /grid/config
[oracle@ttgridvm config]$ grid_create 6 2

info: will create a 6 instance TimesTen grid (k=2)
info: log in /tmp/gridsetup.out
info: started at Fri 16 Mar 11:50:53 GMT 2018

info: destroying any existing TimesTen grid

info: destroying local instances

...

info: grid and database created

info: grid rollout completed successfully

info: software version is '18.1.1.1.0'
info: deployment method - ttGridRollout
info: numinst = 6
info: kval = 2
```

```
info: numhosts = 1
info: dbsize = 100k
info: dbdistpending = N

info: building the database

info: creating 'mobiledemo' database

exec: tsendv1 ttIsq1 -f cr_schema.sql -connstr
DSN=sampled;uid=appuser;pwd=appuser

...

exit;
Disconnecting...
Done.

info: truncating all tables

exec: tsendv1 ttIsq1 -f truncate.sql -connstr
DSN=sampled;uid=appuser;pwd=appuser

...

exit;
Disconnecting...
Done.

...

...

info: database population complete

info: configuration = local
info: maxhosts = 1
info: software version is '11.1.1.1.0'
info: deployment method - ttGridRollout
info: numinst = 6
info: kval = 2
info: numhosts = 1
info: dbsize = 100k
info: dbdistpending = N
info: dbtype = mobiledemo
info: dataset = 100k
```

**b) To check database population (optional step):**

```
[oracle@ttgridvm config]$ tsenv1 database/mobiledemo/count
```

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Type ? or "help" for help, type "exit" to quit ttIsq1.

...

```
select count(*), elementid# from APPUSER.ACCOUNTS group by
elementid#;
< 33797, 1 >
< 33804, 3 >
< 33374, 5 >
3 rows found.
Execution time (SQLExecute + Fetch Loop) = 0.029615 seconds.
```

...

```
exit;
Disconnecting...
Done.
```

You now have a functional and populated 3x2 grid database called **sampledb** with a user/password of appuser/appuser. You can access this using ttIsql or SQL Developer (start that using the icon on the desktop).

You can use the **tsenv[mc1-8]** environment scripts to set your environment for a specific instance or to execute a specific command with its environment set for that instance. The last letter of the script name indicates the instance as follows:

- m** - management instance
- c** - client instance
- 1-8** - data instance 1 through 8

SQL Developer can be used for both SQL based access (e.g. running queries) or for administrative functions. SQL Developer is set to always connect via the client instance for SQL based operations.

You can cleanup everything and revert the VM to a pristine state by stopping SQL Developer and all terminal sessions. Then from a new terminal session execute the command:

```
grid_destroy -force
```

## TimesTen Scaleout Hands on Lab

The VM includes a TimesTen Scaleout 'Hands on Lab'. This is a series of step by step hands on exercises to help you learn the basics of deploying a TimesTen Scaleout database. The HOL typically takes 30-45 minutes to complete.

To use the HOL, double click the 'Hands on Lab' icon on the VM Desktop and then follow the instructions. Make sure that the VM is in its pristine state (see above) before starting the Hands on Lab.

## TimesTen Scaleout Sample Programs

Some fully functional sample programs for TimesTen Scaleout are available as part of the public Github repository '[oracle-timesten-samples](#)' along with the Classic mode QuickStart.

For your convenience the repository contents are installed in the VM at `/home/oracle/oracle-timesten-samples`. The samples have been pre-compiled and you can run them against an already deployed sample database using the 'runSample' script located

in /home/oracle/bin. Run the script without any command line arguments to view the online help.

## **Appendix A - VirtualBox Networking Overview**

VirtualBox allows each VM to be configured with up to 4 network adapters (actually it allows more but the VirtualBox GUI only supports 4). The TimesTen Scaleout VM uses 2 network adapters.

Each network adapter can potentially be configured as one of the following types:

### **NAT**

The VM shares the host's network connectivity at a level higher than that of individual network adapters, The VM is behind an IPv4 NAT (Network Address Translation) firewall and can access any network resources that are accessible to the host. The VM can potentially communicate (to a degree) with the host itself but this is complicated to configure. Similarly the VM can potentially communicate with other VMs running on the host or with VMs running on a different host but this rapidly becomes very complex to manage due to the NAT. Also, this network type has performance limitations due to the thick software stack involved.

NAT adapters are typically used to provide VMs with generic Internet/Intranet access as they are easy to configure and do not depend on the host network environment.

The TimesTen Scaleout VM does not use a NAT adapter.

### **NAT Network**

This is an enhanced form of the NAT adapter and was introduced in VirtualBox 4. All the VMs running on the same host can 'share' the same NAT network thus facilitating communication between VMs running in the same host. You can define multiple NAT Networks to separate traffic from different VMs and control access etc. As with NAT, access to the host from the VM though possible is complex and access to VMs running on other hosts is also complex. The same performance issues exist for inter-host access as they do for simple NAT.

The TimesTen Scaleout VM does not use a NAT Network.

### **Internal Network**

This is a highly optimised network mechanism that interconnects all the VMs running on the same host. You can configure multiple separate internal networks to separate traffic and provide access control. It is not possible for VMs to access the host OS or any external network resources using an internal network.

The TimesTen Scaleout VM is configured with an Internal adapter (intent - eth0) when operating in both 'basic' and enhanced modes. In 'basic' mode it also uses a second Internal adapter (intnet2 - eth1) .

### **Host-only adapter**

This adapter is like an Internal network but it also provides access to the host OS. It is not possible to access any external network resources using a Host only adapter.

The TimesTen Scaleout VM uses a Host-only adapter (vboxnet0 - eth1) in 'enhanced' mode. This allows communication between the host and the VM.

## **Bridged adapter**

This adapter type allows the VM adapter to 'piggy back' onto a specific host network adapter (wired or wireless). Although there is a single connection between the host and the network at large (e.g. an ethernet cable plugged into an ethernet port) the host now appears as having two completely separate network adapters (its own and the VM bridged adapter). The guest OS within the VM must configure this adapter according to how it wants to interact with the external network in exactly the same way as if it were a bare metal machine directly connected to the network. This adapter type has very low overhead and is the most efficient way for a VM to communicate externally including to VMs located on other hosts.

Because using a bridged adapter is the same as connecting a physical machine to the network care must be taken to (a) avoid MAC address conflicts on the local ethernet collision domain (switch) - MAC addresses for VirtualBox adapters are 'synthetic' software configurable values - and (b) avoid IPv4/IPv6 address conflicts between the VM and all other systems on the network being connected to.

The TimesTen Scaleout VM does not use Bridged Network adapters at this time.

## **Appendix B – Accessing the VM from the Host**

Sometimes it is useful to be able to access the VM from the host OS. For example:

1. To login via SSH terminal sessions.
2. To transfer files to the VM using SCP or SFTP.
3. To establish TimesTen client connections from software running on the host (such as SQL Developer) to a database hosted in the VM..

Providing that you have followed the instructions in the Installation and Configuration section all of the above are possible; the host OS has full IPv4 (and possibly IPv6) connectivity to the VM. You can simply refer to the guest by its hostname (ttgridvm-pub or ttgridvm-pub.oracle.net) or, if you did not add the necessary lines to the host's /etc/hosts file, by its IP addresses (10.20.1.51 / 2015:100:100:100::51).

**NOTE:** Access to a local VM from the host may not be possible when certain host based VPN solutions are active, depending on how the VPN software is configured.

## **Appendix C - Replacing the TimesTen software in the VM**

To replace the version of the TimesTen software within the VM (e.g. to pick up bug fixes and improvements) proceed as follows:

1. Download the latest TimesTen software targall and put it somewhere that is accessible from within the VM. Let's say we use a VirtualBox shared folder so the file is located at **/media/sf\_oravbox/Acadia/griddemo/timesten181110.linux8664.tar.gz**
2. Shutdown and destroy any existing grid **-grid\_destroy**
3. Close any open terminal sessions.
4. Open a new terminal session and change directory to the grid software location.

```
cd /grid/sw
```

5. If you wish to preserve the current software, rename it

```
mv tt18.1.2.1.0 tt18.1.2.1.0.prev
```

if not, then remove it

```
rm -rf tt18.1.2.1.0
```

6. Untar the new software

```
tar zxvf /media/sf_oravbox/Acadia/griddemo/timesten181220.linux8664.tar.gz
```

this will create a new directory called **tt18.1.2.2.0**

7. Test the new software version - roll out a grid, populate the database etc.
8. When you are happy, delete the old software (if you saved it).

**NOTE:** If the version of the new software differs from the one previously in use be sure to re-configure the Demo VM to use the new software version by way of the '**gridconfig swversion**' command. Whenever you change the software version in use using **gridconfig swversion** you must close and then reopen any SSH terminal sessions and log out of and back into the VM GUI in order to ensure that the correct aliases are set for ttGridRollout and ttGridDestroy.

## **Appendix D - The 'gridconfig' utility**

The **gridconfig** utility is a convenience utility that can be used to setup, tear down, manipulate and get information about a TimesTen Scaleout grid. Here is the detailed online help as obtained using **gridconfig help**:

Usage:

```
gridconfig swversion [ versionstring ]
gridconfig deploymethod [ ttgridrollout | ttgridadmin ]
gridconfig destroy [-force]
gridconfig create numinst kval [dbsize]
gridconfig shutdown [-force]
gridconfig startup [-force]
gridconfig addinstances n
gridconfig dbdistribute
gridconfig killinstance n
gridconfig killelement n
gridconfig recoverinstance n
gridconfig recoverelement n
gridconfig stopserver n
gridconfig startserver n
gridconfig repoinfo
gridconfig repoclean
gridconfig zkstart
gridconfig zkstop
gridconfig zkrefresh
gridconfig status
gridconfig info
gridconfig help
```

Where:

```
swversion -      Sets the version of the Velocity Scale software
                  to be used and checks that it is installed.
                  This setting is persistent. If no version string
                  is specified then the current value is displayed.
                  Example version string: 18.1.1.1.0

deploymethod -   Sets the grid deployment and cleanup mechanism.
                  'ttgridrollout' means use ttGridRollout and
                  ttGridDestroy while 'ttgridadmin' means use the
                  scripted ttGridAdmin commands This setting is
                  persistent. If no method is specified then the
                  current deployment method is displayed.

destroy         - Tears down any existing grid and cleans up all
                  hosts defined in the current VM configuration.

create         -  Creates a new grid consisting of a total of
                  'numinst' instances with k-safety value 'kval'.
                  The grid database definition is sized to support
                  the 100k customer dataset but you can increase
                  this to 1m by specifying '1m' for dbsize.
                  Create performs an implicit 'destroy' before it
                  rolls out the new grid.
```

- shutdown - Cleanly shuts down the demodb database and the grid. Use the '-force' option to force a shutdown even if the sampledb appears to not be up.
- startup - Starts up an existing grid and sampledb database after it was previously shutdown cleanly using the 'shutdown' command. Use the '-force' option to force a startup even if the sampledb appears to already be up.
- addinstances - Adds 'n' instances to the current grid. 'n' must be a multiple of the grid's 'k' value. Data is NOT redistributed.
- dbdistribute - Redistributes the data in the demo database (sampledb) across all elements in the grid. Typically used after one or more 'addinstances' operations.
- killinstance - Kills the specified instance.  $1 \leq n \leq \text{numinst}$ .
- killelement - Kills the specified element. This is achieved by determining which instance hosts the specified element and then killing that instance.
- recoverinstance - Recovers the specified instance which was previously killed.  $1 \leq n \leq \text{numinst}$ .
- recoverelement - Recovers the specified element. This is achieved by determining which instance hosts the specified element and then recovering that instance.
- stopserver - Stops the server for the specified instance.  $1 \leq n \leq \text{numinst}$ .
- startserver - Starts the server for the specified instance.  $1 \leq n \leq \text{numinst}$ .
- repoinfo - Display the contents of the grid repository. This option can be used even if the grid is not up or is not configured.
- repoclean - Removes all content from the grid repository. This option can be used even if the grid is not up or is not configured.
- zkstart - Starts the Zookeeper server. Not normally needed.
- zkstop - Stops the Zookeeper server. Not normally needed.
- zkrefresh - Forces the grid to refresh its Zookeeper status. Use after a VM suspend/resume.
- status - Displays TimesTen grid status information for the demo database.
- info - Displays information about the current grid

configuration.

help - Displays full help information.

**NOTE:** Whenever you change the software version in use using **gridconfig swversion** you must close and then reopen any SSH terminal sessions and log out of and back into the VM GUI in order to ensure that the correct aliases are set for ttGridRollout.

## **Appendix E - The 'dbconfig' utility**

The **dbconfig** utility is used to create, drop, load data into and get information about the TimesTen demo database. Here is the detailed online help as obtained using **dbconfig help**:

Usage:

```
dbconfig drop [ mobiledemo ]
dbconfig clean
dbconfig create [ mobiledemo ]
dbconfig load {1m | 100k | 10k | 1k} { single | all }
dbconfig info
dbconfig help
```

Where:

drop	- Drops the current grid demo database, if one exists. If an application name is specified then will explicitly try to drop the database for that application.
clean	- Cleans up all temporary data loading files etc.
create	- Creates a new grid demo database for the specified application.
load	- Loads data into the current demo database. The first parameter defines the size of the dataset to use and the second specifies if the load will be performed using a single load stream or one stream per element.
info	- Displays information about the current demo database (if any).
help	- Displays full help information.

## **Appendix F - The 'grid XXXX' wrappers**

Although the **gridconfig** and **dbconfig** commands are easy to use, some convenience wrapper commands are also available.

### **grid\_info**

This command displays information about the current grid and database configuration. it is equivalent to running the command sequence **gridconfig info, dbconfig info**.

### **grid\_destroy [-force]**

This command tears down any existing database and grid.

### **grid\_create n [k]**

This command tears down any existing grid and then deploys a new grid and demo database with 'n' instances and with K factor 'k'. The default for 'k' is 2.

The software version used is the one that has been set using **gridconfig swversion**.

## **Appendix G - VM filesystem layout**

Here are details of the VM's filesystems and their usage:

Filesystem	Size (GB)	Usage
/	16	OS and all standard stuff.
/home	4	oracle home and Scaleout sample apps.
/grid	32	All TimesTen Scaleout related files

## **Appendix H – Further Information, Help and Support**

This VM is not an officially supported Oracle product and support is provided on a best effort basis.

You can get information on TimesTen Scaleout from the [TimesTen OTN portal](#). There you will also find [TimesTen software downloads](#) and the [TimesTen online documentation](#).

You can also ask questions about TimesTen Scaleout and this VM in the [TimesTen OTN Community Forum](#) and you can find interesting articles on the [TimesTen Blog](#).

If you are not able to find the answer to your questions using the above resources, please contact the VM's developer at [chris.jenkins@oracle.com](mailto:chris.jenkins@oracle.com).