



MAK ONE



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1. VR-TheWorld Server First Experience

Thank you for deciding to try out VR-TheWorld Server. This first experience with VR-TheWorld Server demonstrates how easy it is to connect to the server and view streaming terrain in a 2D or 3D simulation application. Although you can stream terrain to any application that supports the osgEarth libraries, to ensure a consistent experience, this guide assumes that you have installed and licensed MAK Data Logger and VR-Vantage as described in "Chapter 3. Installing VR-Vantage and MAK Data Logger" on page 27.

The exercises in this guide use the free VR-TheWorld Server at VR-TheWorld.com. This allows you to evaluate VR-TheWorld Server without actually installing a local server. However, if you choose to install and evaluate a local server, this chapter explains how to do so. MAK can also provide you with a URL for a dedicated instance of the server. If you prefer this last option, please contact your MAK salesperson.



VR-TheWorld.com is accessible via server configuration files (earth files). It is not directly accessible as a URL in a web browser.

Complete documentation of VR-TheWorld Server is in *VR-TheWorld Server Users Guide*, which is included with the product.

1.1. Installing VR-TheWorld Server Software and Data

VR-TheWorld Server is built on the Docker platform. This allows you to use Linux or Windows as platforms to run VR-TheWorld Server.

A VR-TheWorld Server installation has the following software and hardware components:

- Docker. A web-based application used to deliver the VR-TheWorld Server database structure and data.
- VR-TheWorld Server software.
- VR-TheWorld Server database structure and data files. The database provided by MAK is optional. You can create your own database and use your own data files. You can also add your data files to those provided by MAK.
- Hard drive. MAK provides a hard drive with installation scripts and data files.

The minimum recommended hardware configuration for running VR-TheWorld is:

- Server:
 - Quad core
 - 32 GB RAM
 - 250 GB hard drive
- Data storage:
 - 4 TB of usable space (after configuration).
- Operating system:
 - Red Hat 7
 - CentOS 7
 - Windows 10



Installing and configuring Docker on Windows requires changes to your system's BIOS as well as Windows features. Please follow the instructions closely.

1.1.1 Considerations for Using Docker

This section discusses the following issues that you may need to consider when using Docker:

- Ports
- Handling crashes and reboots
- Path syntax

Ports

Docker does not bypass firewalls. It creates rules inside the kernel to redirect traffic that comes to the host. The *docker-compose* file lists the ports that are being used in the following format:

```
host_port : docker_port
```

By default, Docker exposes container ports to the IP address 0.0.0.0. (This matches any IP on the system). If you want to, you can tell Docker which IP address to bind on. For example, to bind on localhost port 80 and container port 8080, you would specify:

```
127.0.0.1:80:8080
```

Some customers may prefer this for security reasons. Otherwise, that host port becomes open to all incoming connections.

Handling Crashes and Reboots

You can implement a restart policy for your Docker container that will prevent the need for you to manually restart the containers in the case of a crash or reboot.

This is done through the `--restart` argument, which can be called within the `docker run` command or the `docker update` command (once containers are running). For our case, the `docker update` command makes more sense, because the `docker run` command is not called explicitly during the installation process.

Here is how to set this for a single container:

```
docker update --restart unless-stopped container_name
```

Here is how to set this for all containers:

```
docker update --restart unless-stopped $(docker ps -q)
```

Table 1 lists the potential values for the `--restart` flag. `unless-stopped` is the most commonly used value. It is designed for the use case of handling a server crash / reboot.

Table 1. Values for `--restart` flag

Command	Description
no	Default value - containers would not be restarted.
on failure	Restarts container in the case of an error (container crashes).
always	Always restart container if it stops.
unless-stopped	Always restart container unless it is manually stopped.

Specifying Paths in Docker

Declare all paths using a forward slash (/), not the Windows-standard backslash (\). Items are appended to Docker paths following a Unix format, therefore a path that mixes backslashes with forward slashes becomes invalid. If you want to declare the paths in a Windows format, set the COMPOSE_CONVERT_WINDOWS_PATHS environment variable to 1.

1.2. Installing VR-TheWorld Server on Linux

This section explains how to install VR-TheWorld Server on Linux operating systems.

1.2.1 Setting Up Your Computer

Variations in Linux systems may create problems installing Docker and running VR-TheWorld Server. Please review the issues discussed in this section to ensure that your system is properly set up.

Partition Setup

It is recommended that you configure */etc/fstab* to point to drives by UUID. If drives are not configured by UUID, the mount locations or order of the drivers might change after you restart the server.

Partitions should use the XFS scheme. Non-XFS partitions may experience problems when copying the contents of the external drive to the internal drive.

Installing Docker on CentOS 8

CentOS has some packages that affect container behavior. Use the `yum autoremove` command to remove the `podman` and `buildah` packages.

1.2.2 Installing Docker

Download and install Docker. Follow the instructions at <https://docs.docker.com/engine/install>.

Install docker-compose

Install docker-compose as follows:

```
sudo curl -L
"https://github.com/docker/compose/releases/download/1.27.4/docker-
compose-$(uname -s)-$(uname -m)" -o /usr/local/bin/docker-compose
```

1.27.4 is the version of docker-compose in this example. If you are installing a different version, use that version number.

Configure the Firewall

Firewall settings may restrict the usage of certain ports through docker.

► **To set up the firewall:**

1. Find out which zone the docker interface it bound to, most likely "no zone":

```
sudo firewall-cmd --get-zone-of-interface=docker0
```

2. Add the dockero interface to the public zone. Changes will be visible only after firewalld reloads:

```
sudo nmcli connection modify docker0 connection.zone public
```

3. Add masquerading, which allows for docker ingress and egress:

```
sudo firewall-cmd --zone=public --add-masquerade --permanent
```

4. Reload firewalld:

```
sudo firewall-cmd --reload
```

5. Reload dockerd:

```
sudo systemctl restart docker
```

1.2.3 Installing the Data Drive

You must mount the data drive and create the installation directory. The drive is in XFS format.

► **To mount the data drive:**

1. The data drive has a USB connection. Attach it to a USB 3.0 port on your computer.
2. Issue the following command to get the location of the drive:

```
sudo fdisk -l
```

This lists all the drives connected to the computer. The MAK data drive is called `/dev/sd*`, where `*` is a letter from a-z). The data drive size is 6000 GBs. Write down the name of the MAK drive.

3. Create the data directory:

```
sudo mkdir -p /data
```

1.2.4 Copy Data or Mount the Data Drive

You can run VR-TheWorld Server from the data drive or copy the data to your computer's hard drive. For best performance, MAK recommends that you copy the data to your computer's hard drive.

- To copy the contents of the MAK data drive to an internal drive, run the following command:

```
xfsdump -J - /dev/NAMEOFDRIVE | xfsrestore -J - /data
```

where `NAMEOFDRIVE` is the name you recorded when you got the location of the disk.



- Copying the data takes 8–10 hours. Do not interrupt the process.
- Partitions should use the XFS scheme. Non-XFS partitions may experience problems when copying the contents of the external drive to the internal drive.

- If you choose to run VR-TheWorld Server from the data drive, rather than copying data, mount the data drive to /data:

```
sudo mount /dev/NAMEOFDRIVE /data
```

where *NAMEOFDRIVE* is the name you recorded when you got the location of the disk.

1.2.5 Installing VR-TheWorld Server

VR-TheWorld Server organizes data into layers, which reference the data files. You must install the database structure. You can do so automatically or manually.

- **To install VR-TheWorld Server:**

1. Change directory to the install directory:

```
cd /data/VRTTheWorld
```

2. Optionally, edit the settings file, *docker-compose.yml*. The file is commented to explain the options. (For more information, see "Configuration Options for Docker" below.)

```
vim docker-compose.yml
```

3. Load the images for VR-TheWorld Server (you must have elevated permissions to run these commands):

```
docker load < postgis_9.5-alpine.tar.gz
```

```
docker load < redis_3.2-alpine.tar.gz
```

```
docker load < vrtheworld_VERSIONOFVRTW.tar.gz
```

where *VERSIONOFVRTW* is the version of VR-TheWorld Server you are installing.

4. Start VR-TheWorld Server:

```
docker-compose up -d
```

You can now access VR-TheWorld Server using its IP address. The default username and password is readymap.

Configuration Options for Docker

In the *docker-compose.yml* file, you can pass optional arguments to our docker container to increase your VR-TheWorld Server performance. These are defined in the optional environment section of the file. Table 2 describes the environment variables.

Table 2. Docker environment variables

Variable	Description
NUM_WORKERS	The number of background workers started for processing general background tasks.
NUM_TILERS	The number of background workers started for seeding map tiles via cache jobs.
NUM_TILE_GENERATORS	The number of background workers started for generating map tiles on demand.
GENERATE_TILES_IN_BACKGROUND_WORKER	Whether to generate tiles on demand in a background process or in the main apache process. By default, tiles are generated in a background process to avoid bogging down the server during periods of high load. Set this environment variable to False to restore the original behavior of generating tiles in the main apache process.
USE_LAYER_NAMES	When set to True, VR-TheWorld Server will expose layers using their name instead of their ID in GIS services. This could make switching between VR-TheWorld Server servers that have similar layer names easier when configuring earth files.

To set environment variables in *docker-compose.yml*, read the instructions at: <https://docs.docker.com/compose/compose-file/#environment>.

1.2.6 Installing the MAK-Supplied Database

VR-TheWorld Server does not presume any particular data. You can load your own database or the database supplied by MAK. If you are using MAK applications such as VR-Vantage or VR-Forces, the terrain database files provided with these applications presume use of the MAK database structure and data files.

This section explains how to load the MAK database.



If you load the MAK database using a script, it removes all of the currently installed data from the server.

► **To install the MAK database:**

1. Change directory to the VR-TheWorld Server install directory:

```
cd /data/VRTheWorld
```

2. Shut down the docker containers and restart them:

```
docker-compose down
docker-compose up -d
```

3. Load the database into readymap:

```
docker-compose exec readymap readymap_restore
/data/backups/vrtw3.db
```

Once the installation process is complete, you can log in to the web interface of VR-TheWorld Server. The default username and password is admin.

1.3. Installing VR-TheWorld Server on Windows

This section explains how to install VR-TheWorld Server on Windows.

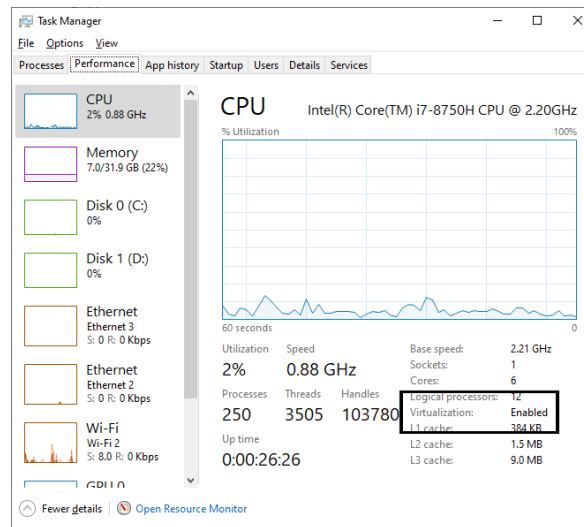
1.3.1 Prerequisites for Using Docker

To use Docker on Windows, you must enable virtualization, WSL2 (Windows Subsystem for Linux), and Hyper-V. These are all capabilities that are built into Windows 10, but which might not be enabled.

► **To check the status of virtualization:**

1. Open Task Manager.
2. Select the Performance tab.
3. The status of virtualization is displayed under the graph (Figure 1).

Figure 1. Task Manager, Performance tab

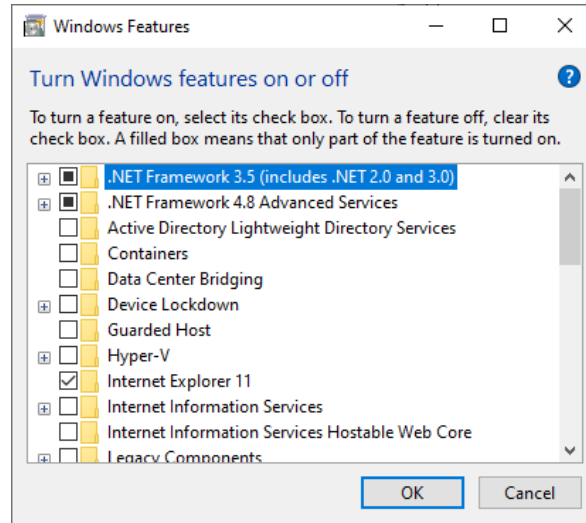


If virtualization is not enabled, you must enable it. Instructions for doing so are readily available using an internet search.

► **To enable Hyper-V and WSL2**

1. Right-click the Start menu icon and select Search.
2. In the Search box, type Windows Features. The search results shows Turn Windows Features On or Off as the best match.
3. Click Turn Windows Features On or Off. The Windows Features dialog box opens (Figure 2).

Figure 2. Windows Features



4. Select the check box next to Hyper-V.
5. Select the check box next to Windows Subsystem for Linux.

1.3.2 Installing Docker

Download and install Docker. Follow the instructions at <https://docs.docker.com/desktop/install/windows-install>.

1.3.3 Attach the Data Drive and Copy Data

The drive provided by MAK for Windows is in NTFS format.

► **To attach the data drive and copy the data:**

1. Plug the USB cable from the data drive into a USB 3.0 port on your machine.
2. Open a console window.
3. Enter:

```
diskmgmt.msc
```

The screen displays a list of all the drives connected to the system.

4. Write down the letter of the data drive provided.
5. In Windows File Explorer, create a directory (folder) called data on the target drive. VR-TheWorld Server will use this directory to store all the files it needs to use.
6. Copy the data from the source directory to your data directory.

1.3.4 Installing VR-TheWorld Server

You can pass optional arguments to our docker container to increase your VR-TheWorld Server performance. These are defined in the optional environment section of the file. Table 2 on page 11 describes the environment variables.

► **To install VR-TheWorld Server on Windows:**

1. Open a console window.
2. Change directory to the data drive:
`cd DATADRIVE:\data\VRTheWorld`
3. In a text editor, open *docker-compose-windows.yml*.
4. Copy all of the content in the file.
5. In a text editor, open *docker-compose.yml*.
6. Replace all of the content with the content you copied from *docker-compose-windows.yml*. (VR-TheWorld Server includes configurations for Linux and Windows. However, Docker only looks for *docker-compose.yml*, so you have to replace the Linux configuration information with the Windows configuration.)
7. Examine the content of the file. If there are any backslashes (\), replace them with forward slashes (/).
8. In lines 15 and 16, replace DATADRIVE with the drive letter on which the data is installed.
9. Save the file and close it.
10. In your console window, in DATADRIVE:\data\VRTheWorld, execute the following commands:

```
docker load -i postgres_9.5-alpine.tar.gz
docker load -i redis_3.2-alpine.tar.gz
docker load -i vrtheworld_VERSIONOFVRTW.tar.gz
```

where VERSIONOFVRTW is the version of VR-TheWorld Server that you are installing.

11. Start VR-TheWorld Server:

```
docker-compose up -d
```

You can now access VR-TheWorld Server using its IP address. The default username and password is readymap.

1.3.5 Installing the MAK-Supplied Database

VR-TheWorld Server does not presume any particular data. You can load your own database or the database supplied by MAK. If you are using MAK applications such as VR-Vantage or VR-Forces, the terrain database files provided with these applications presume use of the MAK database structure and data files.

This section explains how to load the MAK database.



If you load the MAK database using a script, it removes all of the currently installed data from the server.

► To install the MAK database:

1. Change directory to the VR-TheWorld Server install directory:

```
cd DATADRIVE:\data\VRTheWorld
```

2. Shut down the docker containers and restart them:

```
docker-compose down  
docker-compose up -d
```

3. Copy *vrtw3.db* to the *./data/added* directory. (Docker will see this as *./data/vrtw3.db* because our default mount location is *./data/added*, as configured by the *docker.yml* file.)

4. Load the database into readymap (this will take 5 to 10 minutes):

```
docker-compose exec readymap readymap_restore /data/vrtw3.db
```

Once the installation process is complete, you can log in to the web interface of VR-TheWorld Server. The default username and password is admin.

1.4. Connecting to a MAK-Supplied Server

If you have a server that was provided by MAK, VR-TheWorld Server is configured to use DHCP and it has a static IP address. If your network has dynamic DNS set up, you can connect to the server without further configuration. If you do not have dynamic DNS, you must configure an IP address for the server.



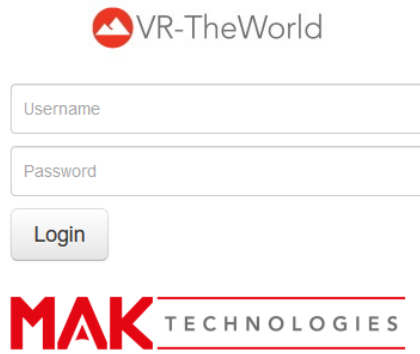
- For web connections, the default user is admin. The default password is admin. You can change these passwords.
- VR-TheWorld Server does not work with Internet Explorer. Use Firefox, Chrome, or Edge.

1.4.1 Connecting to VR-TheWorld Server Using Dynamic DNS

► To connect to the server using dynamic DNS:

1. Set up the server and connect it to the network.
2. Open a web browser.
3. Point the browser to <http://localhost/vr-theworld>.

Figure 3. VR-TheWorld Server



The image shows the login interface for the VR-TheWorld Server. At the top center is the VR-TheWorld logo, which consists of a red circle with a white mountain peak icon inside, followed by the text "VR-TheWorld" in a grey sans-serif font. Below the logo are two input fields: the first is labeled "Username" and the second is labeled "Password". Both fields are white with a thin grey border. Below the password field is a grey button with the word "Login" in white text. At the bottom of the interface is the MAK Technologies logo, which features the word "MAK" in a large, bold, red sans-serif font, followed by the word "TECHNOLOGIES" in a smaller, grey sans-serif font, all enclosed within a red rectangular border.

4. Click admin in the upper-right corner of the window. The default user is admin. The default password is admin. It is recommended that you change the password the first time you log in.
5. Configure the server, as described in the *VR-TheWorld Server Users Guide*.



2. Using VR-TheWorld Server

This chapter will help you:

- Chapter 2.1. Connect VR-Vantage to VR-TheWorld Server
- Chapter 2.3. View Simulated Entities on VR-TheWorld Server Terrain
- Chapter 2.4. Explore Terrain in the VR-TheWorld Server Web Interface

2.1. Connect VR-Vantage to VR-TheWorld Server

The purpose of a terrain server such as VR-TheWorld Server is to provide high-quality streaming terrain to applications that need it for simulation purposes. That is, the terrain is not just for looking at (imagery), but needs to provide the elevation data required by applications that are simulating entities on the land, the sea, and in the air. In this part of the guide we show how easy it is to get terrain data from VR-TheWorld Server into an application (VR-Vantage).

By default, the procedure in this chapter will connect you to the MAK public version of VR-TheWorld Server. If you want to use your own server, the easiest way to do that is to change your hosts file to point to your server instead of the MAK public server. To do this on Windows:

1. Log into your computer with administrator privileges.
2. In a text editor, open `C:\windows\system32\drivers\etc\hosts`.
3. Add the following lines to the file:

```
10.10.10.10 www.vr-theworld.com
10.10.10.10 vr-theworld.com
```

where `10.10.10.10` is replaced with the IP address of your server.

2.1.1 Start VR-Vantage and Connect to VR-TheWorld Server

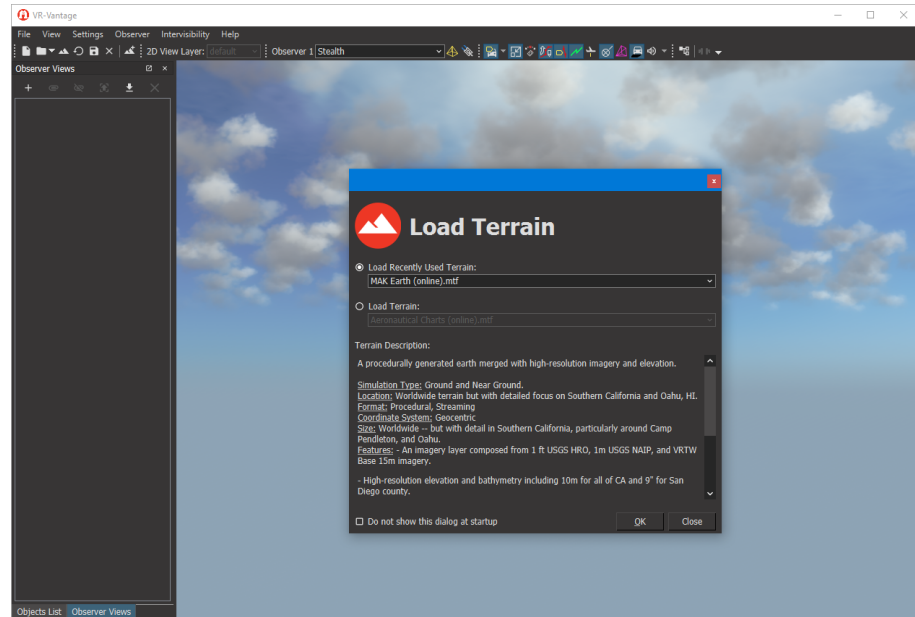
VR-Vantage provides a 3D situational awareness view of the world. VR-Vantage includes a server connection configuration file (an `.earth` file) that is configured to connect to the VR-TheWorld running at VR-TheWorld.com.

► **To start VR-Vantage:**

1. On the Windows Start menu, choose **MAK Technologies > VR-Vantage (64-bit)**. VR-Vantage starts up.

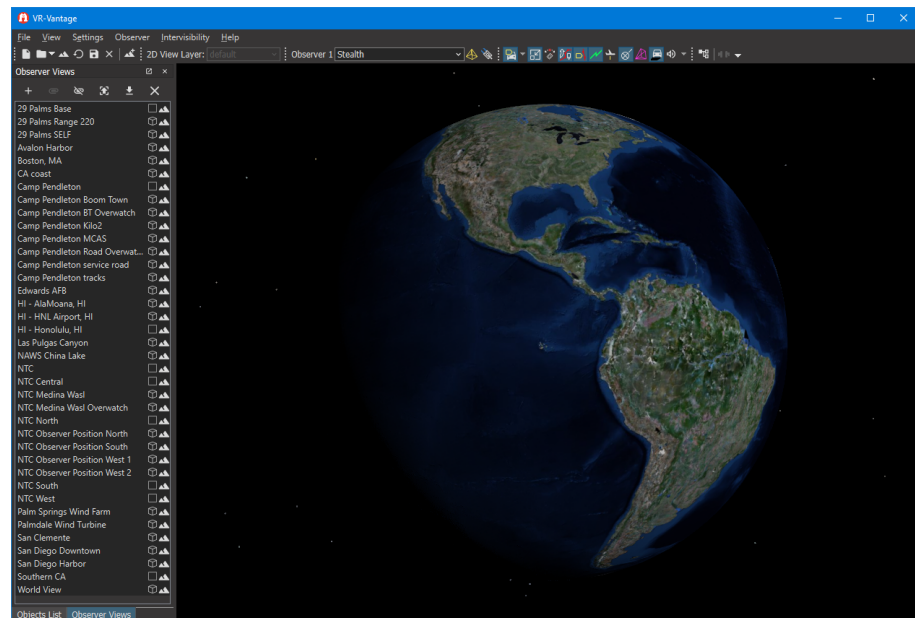
The Load Terrain dialog box opens (Figure 4).

Figure 4. Load Terrain dialog box



2. Click Close. (The terrains listed in the Load Terrain dialog box connect to VR-TheWorld Server, but do not let you load a terrain server directly.)
3. On the Terrain Toolbar, click the Add Server Connection button (🌐). The Add Terrain Server dialog box opens.
4. In the Servers list, select *MAK Earth (online).earth*.
5. Click Connect. VR-Vantage connects to the server and immediately starts to stream in terrain data.

Figure 5. MAK Earth (online) terrain

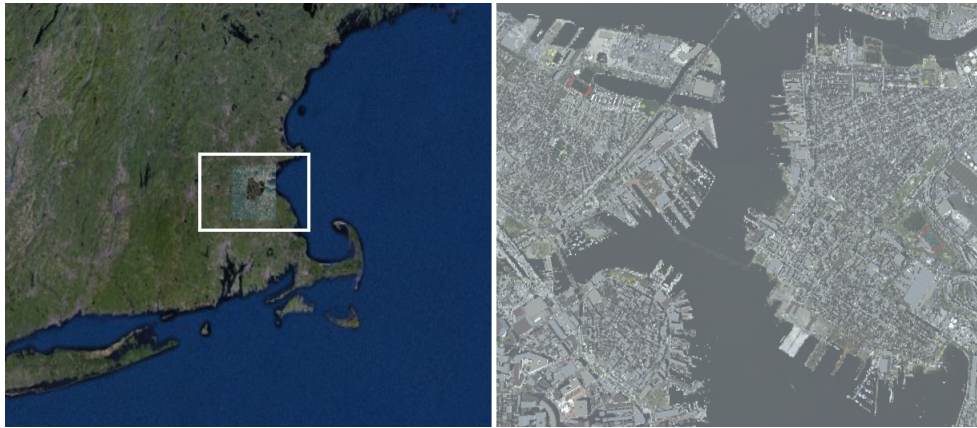


2.2. Navigating the Terrain

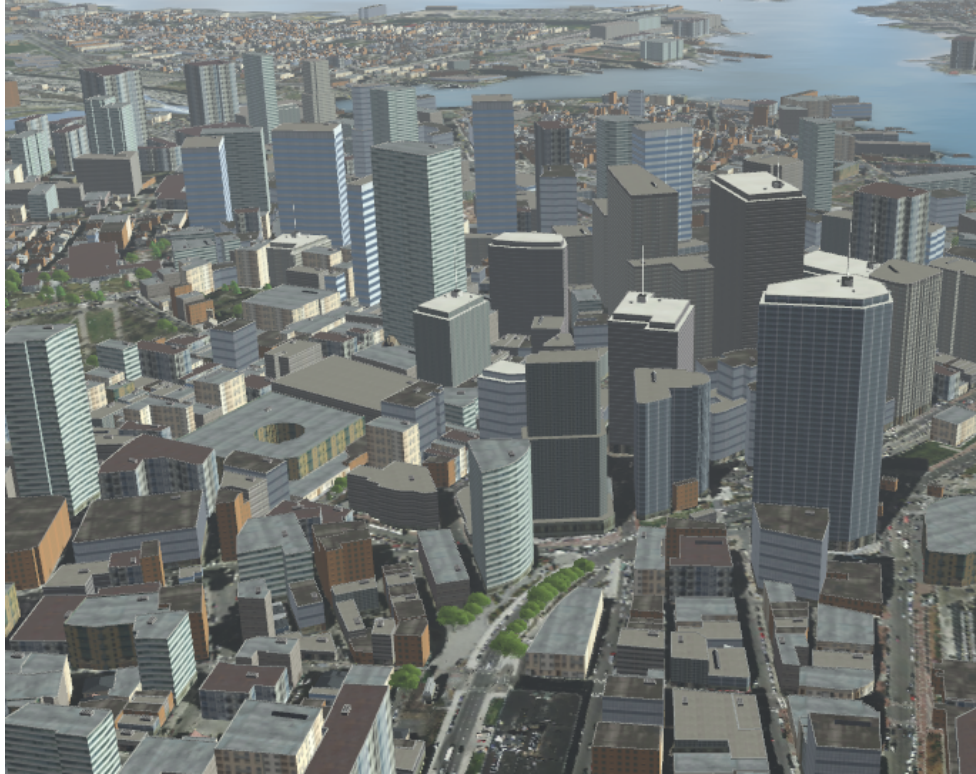
When you first connect to VR-TheWorld, the data is streamed in at a low resolution because the observer is high above the earth. Use the mouse and the **Q**, **W**, **E**, **A**, **S**, and **D** keys to rotate the view of the earth and zoom in and out:

- Press **Q** to rotate the earth so that North America is centered.
- Press **W** to zoom in. Zoom in a little bit at a time. As you zoom in, see how the detail increases as terrain is streamed in.
- Use the mouse to drag the terrain so that Boston, Massachusetts is centered in the view. Then zoom in to see the highly detailed inset.

Figure 6. Boston inset



- Hold down the right mouse button and move the mouse to change the orientation. Then press **E** to move the eyepoint down towards the ground. The terrain is populated with geotypical buildings on the footprints of the buildings in the city (Figure 7).

Figure 7. Geotypical buildings

VR-TheWorld Server has footprint data for many cities and can dynamically extrude buildings on those footprints. Continue to explore the terrain until you are ready to move to the next exercise in this guide.

2.3. View Simulated Entities on VR-TheWorld Server Terrain

So far, we have demonstrated VR-TheWorld Server in a world without any simulated entities. Now we will show how you can use VR-TheWorld Server to provide terrain under distributed simulation scenarios. To do this, we need to connect to the DIS network, start the Logger, and play a Logger recording.



If for some reason you decided not to install the Logger, please skip this section. However, if you have a simulation application that you can use to generate entity messages, you can use it to evaluate how you can view entities on VR-TheWorld Server terrain.

The default connection for the Logger and the DIS (7) connection for VR-Vantage use port 3000. If for some reason you have changed the default port for one or both of these applications, you must change them to make sure they match.

You must also make sure that the exercise IDs match.

2.3.1 Connect to a Simulation Network

1. In VR-Vantage, choose **Settings > Connection**. The Simulation Connections dialog box opens.
2. In the list of connections, select DIS (7).
3. Click Connect.

2.3.2 Start the Logger and Play a Simulation

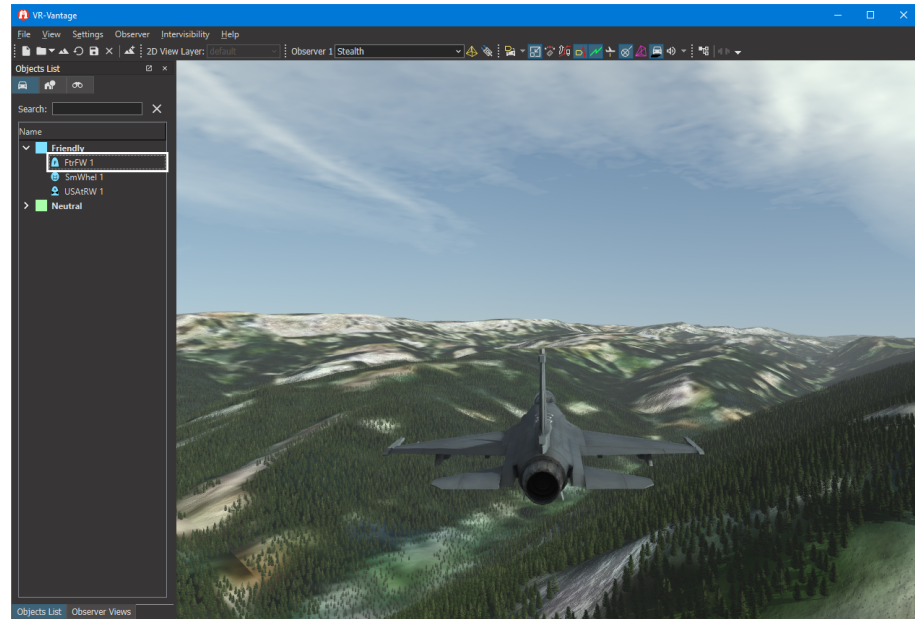
1. On the Start menu, choose **MAK Technologies > Logger DIS 64-bit**. The Logger starts.
2. Choose **File > Open**. The Open File dialog box opens.
3. Select *VR-TheWorld_FirstExperienceDIS.lgr*.
4. Click Open.
5. Choose **Play > Toggle Loop at End**. This will cause the recording to continuously loop back to the beginning when it reaches the end.
6. Choose **Play > Play/Pause**, or click the Play button.

2.3.3 View the Entities

The scenario you are viewing has three entities – a jet flying over the Rocky Mountains, a helicopter flying over an inset of Boston, Massachusetts, USA, and a truck driving on a road in Afghanistan.

1. In the Objects List Panel at the left of the VR-Vantage window, right-click FtrFW 1 and choose Attach Tether. VR-Vantage displays a fighter flying through the Rocky Mountains as terrain streams in from VR-TheWorld Server underneath. Notice how the server is providing both imagery and elevation.

Figure 8. Fighter jet over the Rocky Mountains



2. In the Objects List Panel, right-click USAtRW 1 and choose Attach Tether. The observer is now attached to a helicopter flying over the Boston inset. (It may take a few seconds for VR-Vantage to stream in the highest resolution imagery from the server.)

VR-TheWorld Server comes with 15m imagery for the entire earth. However, as with this Boston inset, it can support very high resolution data as well. We have provided a few free, high-resolution insets to demonstrate this capability. When you deploy VR-TheWorld Server, you can add as much data as you would like, based on the needs of your application.

You might want to press **S** to zoom out a little for a better view of the inset. Press **Spacebar** to return to the default view of the entity.

3. In the Objects List Panel, right-click SmWhel 1 and choose Attach Tether. This entity is a HMMVW driving along a road in Afghanistan. (Again, it may take 30 seconds or so for terrain to stream in at the highest level of resolution. Until then, the HMMVW may appear to be in the air.)

The application that we used to generate this recording, VR-Forces, used the VR-TheWorld Server streaming terrain in its simulation engine. Since the terrain used to simulate the entities and the terrain you are using to visualize them is the same, as you watch the HMMVW drive in VR-Vantage you can see that it maintains its proper relationship to the terrain. VR-TheWorld Server can provide perfectly correlated streaming terrain to a variety of simulation and visualization applications.

2.4. Explore Terrain in the VR-TheWorld Server Web Interface

Up to now we have been viewing the data set specified in a connection configuration file included with VR-Vantage. Suppose you want to know what else is available on your server? You can open the VR-TheWorld Server web interface and explore the

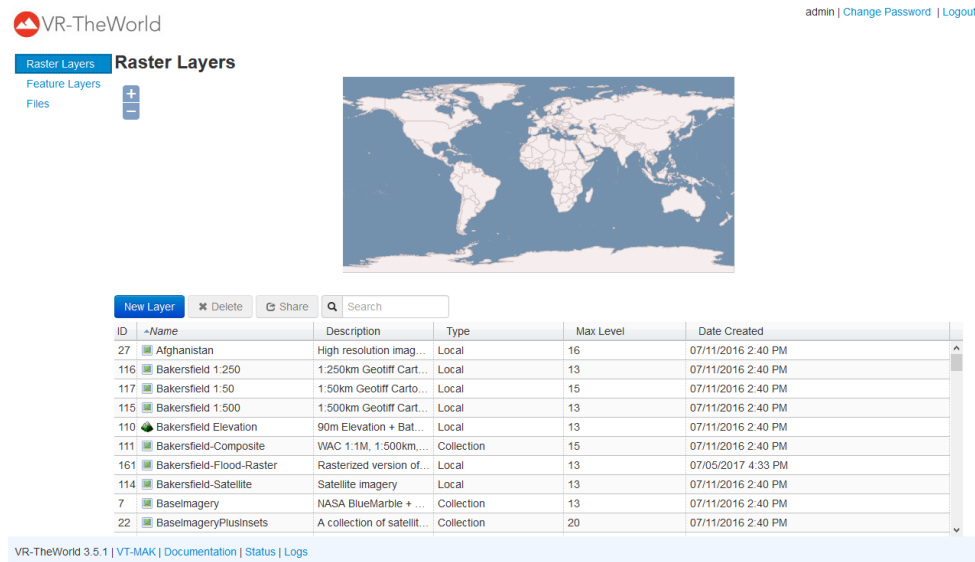
maps and layers on the server.



You must have access to a local server for this part of the first experience.

- To open the web interface, connect to your local server as described in "1.4. Connecting to a MAK-Supplied Server" on page 15. The browser displays the interface.

Figure 9. VR-TheWorld web interface

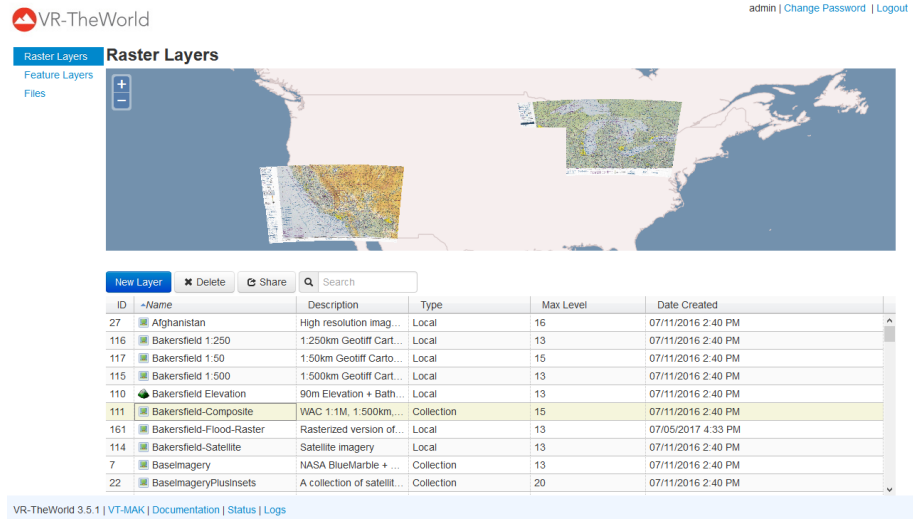


2.4.1 Explore a Layer

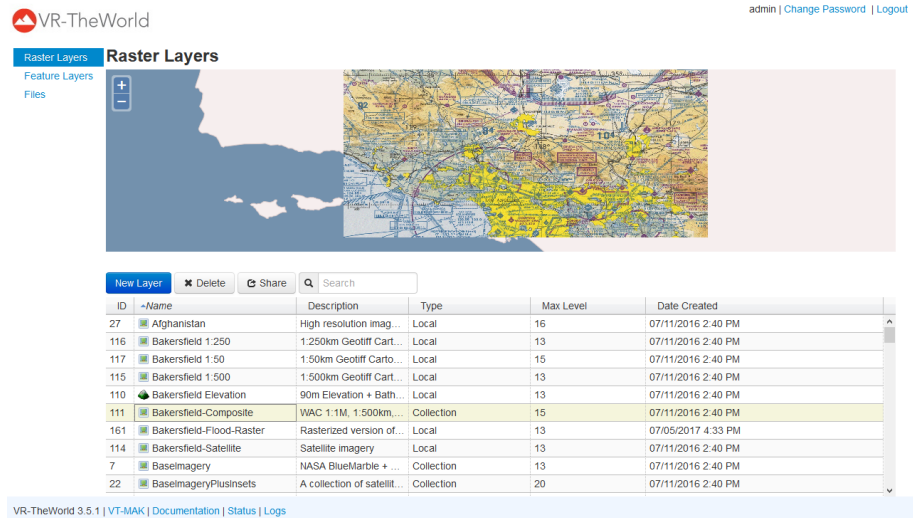
VR-TheWorld Server's data sets are organized in layers. Layers are composed of files. The VR-TheWorld Server web interface lets you view the individual layers and their characteristics. Most importantly, it provides URLs that allow you to connect your application to the terrain server.

(Creating and editing your own layers is an administrative task, which is not covered in this guide.)

1. The default view is the list of raster layers
2. In the list, select the Bakersfield-Composite layer. A map is displayed. Note the topographic map in the southwestern United States.

Figure 10. Bakersfield composite layer

- Zoom in on the west coast of the United States. As you zoom in, the map becomes more detailed. VR-TheWorld Server is actually providing different maps with increasing detail, based on the zoom level in your web client.

Figure 11. San Diego layer



3. Installing VR-Vantage and MAK Data Logger

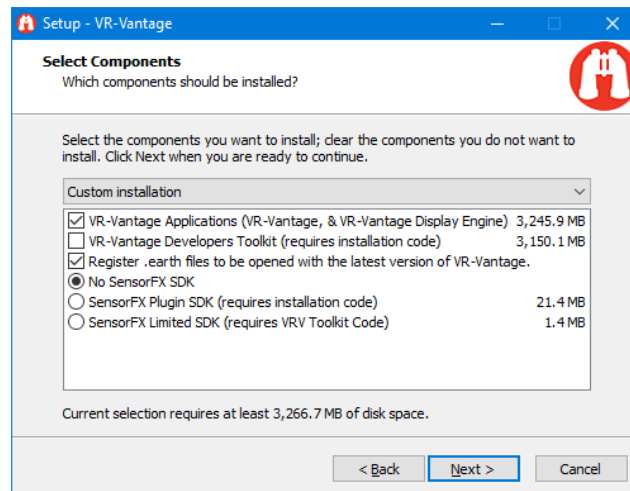
To evaluate VR-TheWorld Server, you need an application that can connect to the server and use the streaming data. Ideally you should also have an application that can generate entity data to visualize. For that purpose, MAK has provided an evaluation license for VR-Vantage, our 3D viewing application, and MAK Data Logger, to send some entity traffic over the network. This chapter provides installation and setup instructions for these applications.

3.1. Install VR-Vantage and the Logger

Your MAK salesperson has given you a link to the VR-Vantage and Logger installers, the license manager installer, and possibly a sample Logger file to support your first user experience. Download the files. Before you install the applications, note the following possible issues:

- When you install VR-Vantage, there may be a delay of up to several minutes from the time you try to run the setup program to the time that an installation dialog box is displayed. If you experience this problem, turning off User Access Control can reduce or eliminate this delay.
 - These instructions assume you are familiar with installing Windows applications that use a wizard-style installer. They also assume that you have an unzipping application and know how to use it.
- To install VR-Vantage, run the installer. On the VR-Vantage Installation Code page, click Skip Toolkit Installation.

Figure 12. VR-Vantage setup wizard



- Run the MAK Data Logger installer. Accept all of the default settings.

3.2. Setting Up the License Manager

To use a MAK product, you must install the MAK License Manager and get a license for your product. Before you can use a MAK product, you must obtain a valid license file and specify the license server.

- To install the MAK License Manager, run the installer.

The general procedure for configuring license management is as follows:

1. Identify the name and ID of the license server and request a license file.
2. Put the license file in the *MAK/MAKLicenseManager* directory on the license server.

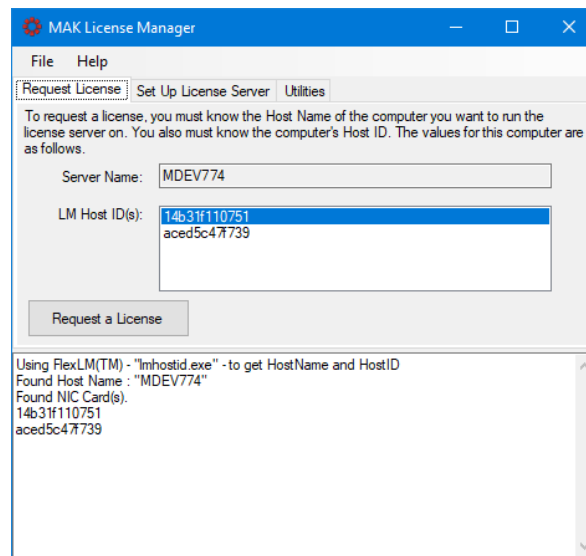
3. Run the license server.
4. Specify the license server location.

3.2.1 Identify the Host ID and License Server Name

For simplicity, use the computer on which you installed VR-TheWorld Server as the license server. To find out the host ID and license server name:

1. On the Start menu, choose **MAK Technologies > MAK License Manager**. The MAK License Manager utility opens.

Figure 13. License Manager



2. Select the Request License tab. It displays the server name and the IDs for your network cards.
3. If you have more than one network card, select the one that you want to use as Host ID.
4. Send the host ID and hostname to your MAK salesperson. MAK will e-mail you a license file.

3.2.2 Put the License File in the *MAKLicenseManager* Directory

When you receive your license file, put it in the *MAKLicenseManager* directory on the license server. The file should have the extension *.lic*. If it does not, please send an email to keys@mak.com to clarify why it did not follow this convention.

3.2.3 Run the License Server

- To start the license server daemon, on the server machine only, execute **runLm** from the *MAKLicenseManager* directory.

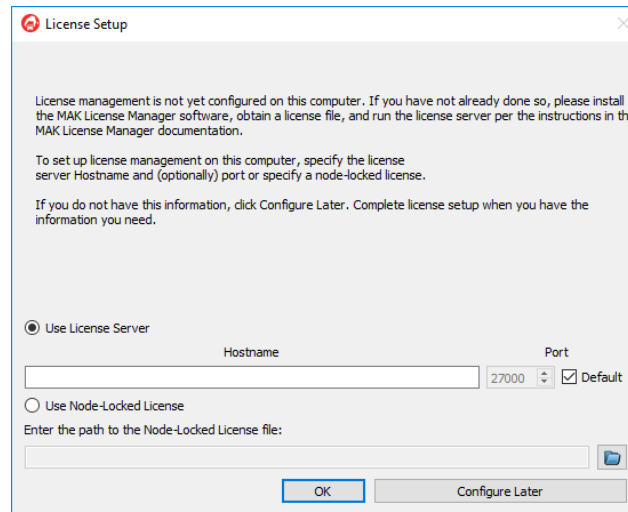
Shutting Down the License Server

- To force all applications to check in their licenses and shut down the license server daemon, run **lmdown**.

3.2.4 Specify the License Server

The first time you run a MAK application on a computer, the License Setup dialog box opens. It prompts you to enter the hostname of the license server and optionally, a port number.

Figure 14. License Setup dialog box



1. Type the hostname in the Hostname box.
2. Click Add License Server. The application will start.



MAK ONE

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