DEPLOYMENT GUIDE

DEPLOYING F5 WITH VMWARE VIRTUAL DESKTOP INFRASTRUCTURE (VDI)

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Deploying F5 with VMware Virtual Desktop Infrastructure

Welcome to the F5 Deployment Guide on VMware Virtual Desktop Infrastructure (VDI). This document provides guidance and configuration procedures for deploying the BIG-IP Local Traffic Manager (LTM) with VMware VDI.

VMware VDI is an integrated desktop virtualization solution that delivers enterprise-class control and manageability with a familiar user experience. VMware VDI, built on VMware's industry leading and proven virtualization platform, provides new levels of efficiency and reliability for your virtual desktop environment.

One of the unique features of this deployment is the ability of the BIG-IP LTM system to persist VDI client connections on a session by session basis. Other implementations commonly use simple/source address persistence; where all the connections from a single IP address will be sent to one server. With the iRule described later in this document, the BIG-IP LTM is able to direct traffic with greater precision resulting in a more uniform load distribution on the connection servers.

For additional resources on F5 and VMware, see the **VMware forum on DevCentral**.

Prerequisites and configuration notes

The following are prerequisites for this solution:

- We recommend running BIG-IP LTM version 9.4 or later.
- Because the BIG-IP LTM system is offloading SSL for the VMware deployment, this deployment guide does not include VMware Security servers.
- This deployment guide is written with the assumption that VMware server(s), Virtual Center and VDM server(s) are already configured on the network and are in good working order.

Product Tested	Version Tested
BIG-IP Local Traffic Manager (LTM)	9.4.4
VMware VDI	2.1.0

Configuration example

In our configuration presented in this deployment guide, the client, using the VDI client or a web browser, connects to the VMware Virtual Desktop Manager (VDM) via the virtual server on the BIG-IP LTM system. The BIG-IP LTM system selects a node from the VDM pool based on health monitor status and load balancing algorithm. At the same time, persistence records are created that the BIG-IP LTM will use to make ensure that clients return to the proper device.

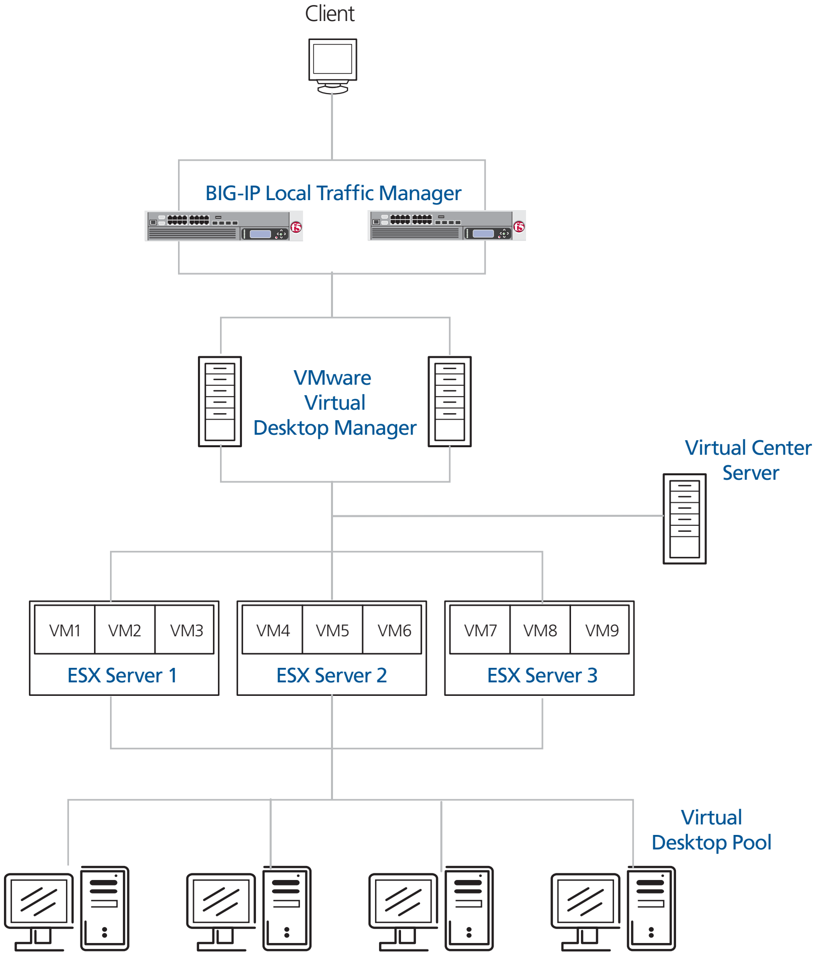


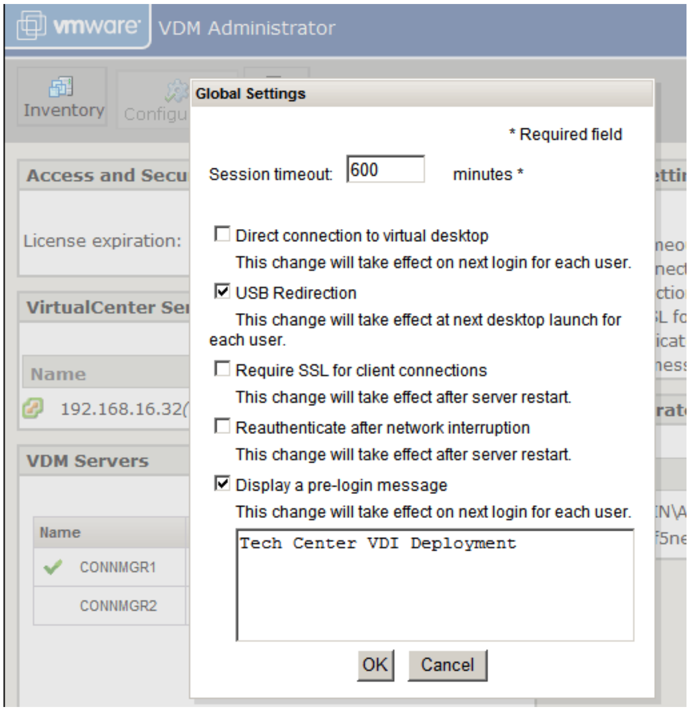
Figure 1 *Logical configuration diagram*

Modifying the VMware Virtual Desktop Manager global settings

In this section, we modify the VDI configuration to allow the BIG-IP LTM system to load balance VDI connections and offload SSL transactions. In the following procedure, we disable the SSL requirement for client connections in the Virtual Desktop Manager Administrator tool.

To modify the VMware configuration

1. Log on to the VDM Administrator tool.
2. Click the **Configuration** tab.
   The configuration options page opens.
3. In the Global Settings box, click the **Edit** button.
4. Clear the check from the **Require SSL for client connections** box.
5. Click the **OK** button.



Global Settings

* Required field

Session timeout: 600 minutes *

☐ Direct connection to virtual desktop
This change will take effect on next login for each user.

☑ USB Redirection
This change will take effect at next desktop launch for each user.

☐ Require SSL for client connections
This change will take effect after server restart.

☐ Reauthenticate after network interruption
This change will take effect after server restart.

☑ Display a pre-login message
This change will take effect on next login for each user.

Tech Center VDI Deployment

***Figure 2** Modifying the VDM Global Settings*

◆ Note

This setting will only apply to Connection Manager servers -- Security servers will always require SSL

Configuring the BIG-IP LTM system for VMware VDI

In this section, we configure the BIG-IP LTM for the VMware VDI deployment. As noted previously, we do not use the VMware security servers in our configuration, so we are only configuring the BIG-IP LTM for the VMware Connection servers.

To configure the BIG-IP LTM system, you must complete the following procedures:

- *Creating the health monitor*
- *Creating the Connection server pool*
- *Creating the persistence iRule*
- *Using SSL certificates and keys*
- *Creating BIG-IP LTM profiles*
- *Creating the virtual server*

◆ **Note**

If you are using VMware Security servers with the BIG-IP LTM system, in addition to a Client SSL profile, you will have to create a Server SSL profile. See the BIG-IP LTM documentation for details. VMware Security servers were not a part of our deployment scenario.

Creating the health monitor

The first step is to set up a health monitor for the VMware Connection servers. This procedure is optional, but very strongly recommended. For this configuration, we create a simple HTTP health monitor. In this example, the advanced fields are not required, and we recommend you use the default values for the send and receive strings.

To configure a HTTP health monitor

1. On the Main tab, expand **Local Traffic**, and then click **Monitors**.
   The Monitors screen opens.
2. Click the **Create** button.
   The New Monitor screen opens.
3. In the **Name** box, type a name for the Monitor.
   In our example, we type **vdi-connection**.
4. From the **Type** list, select **HTTP**.
   The HTTP Monitor configuration options appear.
5. In the Configuration section, in the **Interval** and **Timeout** boxes, type an Interval and Timeout. We recommend at least a 1:3 +1 ratio between the interval and the timeout (for example, the default setting has an interval of **5** and an timeout of **16**). In our example, we use a **Interval** of **30** and a **Timeout** of **91**.

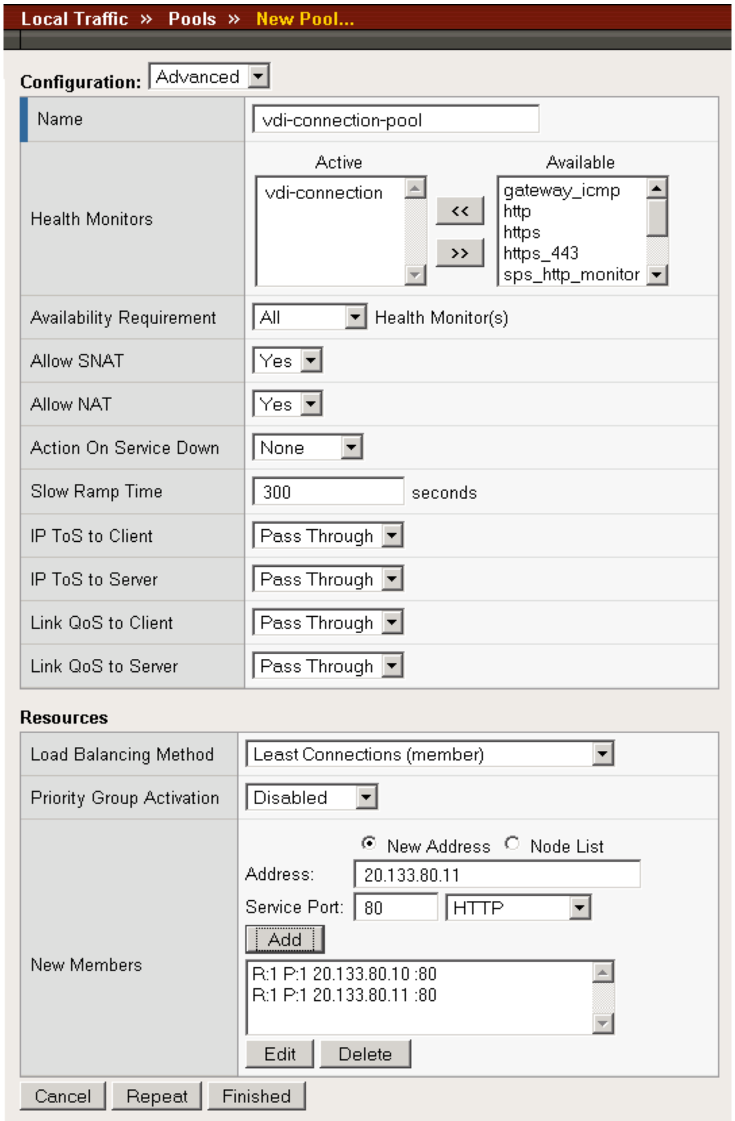
6. Click the **Finished** button.
   The new monitor is added to the Monitor list.

Creating the Connection server pool

The next step is to create a pool on the BIG-IP LTM system for the Connection servers. A BIG-IP pool is a set of devices grouped together to receive traffic according to a load balancing method.

To create the pool

1. On the Main tab, expand **Local Traffic**, and then click **Pools**.
   The Pool screen opens.
2. In the upper right portion of the screen, click the **Create** button.
   The New Pool screen opens.
3. From the **Configuration** list, select **Advanced**.
   The Advanced configuration options appear.
4. In the **Name** box, enter a name for your pool.
   In our example, we use **vdi-connection-pool**.
5. In the **Health Monitors** section, select the name of the monitor you created in the *Creating the health monitor* section, and click the Add (**<<**) button. In our example, we select **vdi-connection**.
6. In the **Slow Ramp Time** box, type **300**. We set the Ramp Time in order to ensure that if a pool member becomes available after maintenance or a new member is added, the Least Connections load balancing algorithm does not send all new connections to that member (a newly available member will always have the least number of connections).
7. From the **Load Balancing Method** list, choose your preferred load balancing method (different load balancing methods may yield optimal results for a particular network).
   In our example, we select **Least Connections (member)**.
8. For this pool, we leave the Priority Group Activation **Disabled**.
9. In the New Members section, make sure the **New Address** option button is selected.
10. In the **Address** box, add the first server to the pool. In our example, we type **10.133.80.10**
11. In the **Service Port** box, type **80**.
12. Click the **Add** button to add the member to the list.
13. Repeat steps 9-12 for each server you want to add to the pool.
    In our example, we repeat these steps once for **10.133.80.11**.
14. Click the **Finished** button (see Figure 3).



Local Traffic » Pools » New Pool...

Configuration: Advanced

Name	vdi-connection-pool
Health Monitors	Active: vdi-connection Available: gateway_icmp, http, https, https_443, sps_http_monitor
Availability Requirement	All Health Monitor(s)
Allow SNAT	Yes
Allow NAT	Yes
Action On Service Down	None
Slow Ramp Time	300 seconds
IP ToS to Client	Pass Through
IP ToS to Server	Pass Through
Link QoS to Client	Pass Through
Link QoS to Server	Pass Through

Resources

Load Balancing Method	Least Connections (member)
Priority Group Activation	Disabled
New Members	● New Address ○ Node List Address: 20.133.80.11 Service Port: 80 HTTP R:1 P:1 20.133.80.10 :80 R:1 P:1 20.133.80.11 :80

Figure 3 Configuring the BIG-IP LTM pool

Creating the persistence iRule

Using the following iRule, the BIG-IP LTM is able to direct traffic with greater precision resulting in a more uniform load distribution on the connection servers. The iRule looks for session information so that the BIG-IP LTM can persist the connections to the proper nodes. The VDI clients will first use the session information in a cookie, and then will use it as an URI argument when the tunnel is opened. The first response from the server contains a JSESSIONID cookie. The iRule enters that session ID into the connection table and upon further client requests looks for the information in a cookie or in the URI.

◆ **Important**

For the following iRule to function correctly, you must be using the BIG-IP LTM system to offload SSL transactions from the VDI implementation, which is described in this deployment guide.

To create the persistence iRule

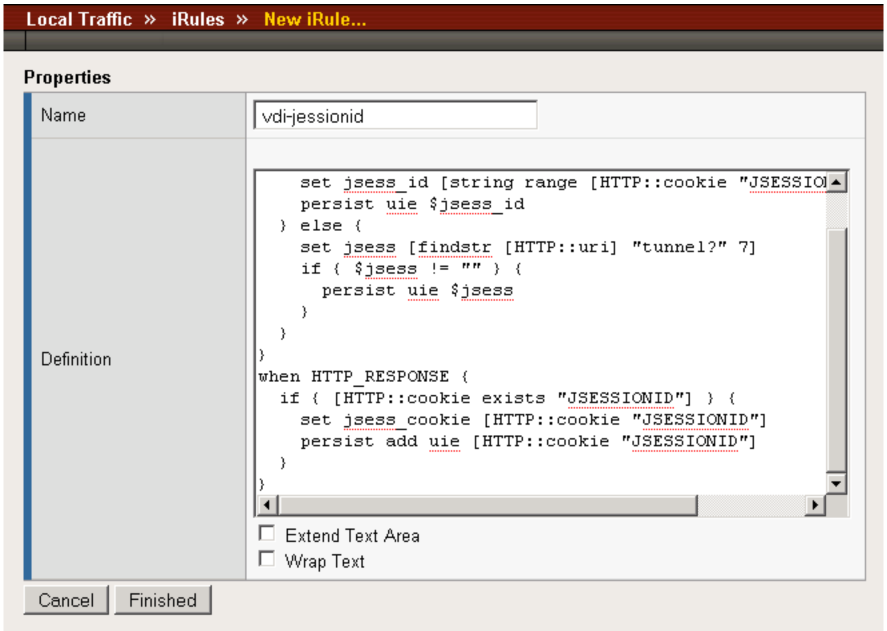
1. On the Main tab, expand **Local Traffic**, and then click **iRules**. The iRule screen opens.
2. In the upper right portion of the screen, click the **Create** button. The New iRule screen opens.
3. In the Name box, type a name for this rule. In our example, we type **vdi-jessionid**.
4. In the Definition box, paste the following rule.

```
 when HTTP_REQUEST {
  if { [HTTP::cookie exists "JSESSIONID"] } {
    # log local0. "Client [IP::client_addr] sent cookie
[HTTP::cookie "JSESSIONID"]"
    set jsess_id [string range [HTTP::cookie
"JSESSIONID"] 0 31]
    persist uie $jsess_id
    # log local0. "uie persist $jsess_id"
  } else {
    # log local0. "no JSESSIONID cookie, looking for
tunnel ID"
    set jsess [findstr [HTTP::uri] "tunnel?" 7]
    if { $jsess != "" } {
      # log local0. "uie persist for tunnel $jsess"
      persist uie $jsess
    }
  }
}
when HTTP_RESPONSE {
  if { [HTTP::cookie exists "JSESSIONID"] } {
    set jsess_cookie [HTTP::cookie "JSESSIONID"]
    persist add uie [HTTP::cookie "JSESSIONID"]
    # log local0. "persist add uie [HTTP::cookie
"JSESSIONID"] server: [IP::server_addr] client:
[IP::client_addr]"
  }
}
# when LB_SELECTED {
  # log local0. "Member [LB::server addr]"
# }
```

5. Click the **Finished** button.

◆ **Tip**

The preceding iRule contains logging statements that are commented out. If you want to enable logging, simply remove the comment (#) from the code.



Properties

Name: vdi-jessionid

Definition:

```
    set jsess_id [string range [HTTP::cookie "JSESSIO
    persist uie $jsess_id
  } else {
    set jsess [findstr [HTTP::uri] "tunnel?" 7]
    if { $jsess != "" } {
      persist uie $jsess
    }
  }
}
when HTTP_RESPONSE {
  if { [HTTP::cookie exists "JSESSIONID"] } {
    set jsess_cookie [HTTP::cookie "JSESSIONID"]
    persist add uie [HTTP::cookie "JSESSIONID"]
  }
}
```

☐ Extend Text Area

☐ Wrap Text

Figure 4 *Configuring the persistence iRule on the BIG-IP LTM system*

Using SSL certificates and keys

Before you can enable the BIG-IP LTM system to act as an SSL proxy, you must install a SSL certificate on the virtual server that you wish to use for VDI connections on the BIG-IP LTM device. For this Deployment Guide, we assume that you already have obtained an SSL certificate, but it is not yet installed on the BIG-IP LTM system. For information on generating certificates, or using the BIG-IP LTM to generate a request for a new certificate and key from a certificate authority, see the **Managing SSL Traffic** chapter in the ***Configuration Guide for Local Traffic Management***.

Importing keys and certificates

Once you have obtained a certificate, you can import this certificate into the BIG-IP LTM system using the Configuration utility. By importing a certificate or archive into the Configuration utility, you ease the task of managing that certificate or archive. You can use the Import SSL Certificates and Keys screen only when the certificate you are importing is in Privacy Enhanced Mail (PEM) format.

To import a key or certificate

1. On the Main tab, expand **Local Traffic**.
2. Click **SSL Certificates**. The list of existing certificates displays.
3. In the upper right corner of the screen, click **Import**.
4. From the **Import Type** list, select the type of import (Certificate or Key).
5. In the **Certificate** (or **Key**) **Name** box, type a unique name for the certificate or key.
6. In the **Certificate** (or **Key**) **Source** box, choose to either upload the file or paste the text.
7. Click **Import**.

If you imported the certificate, repeat this procedure for the key.

Creating BIG-IP LTM profiles

BIG-IP version 9.0 and later use profiles. A ***profile*** is an object that contains user-configurable settings for controlling the behavior of a particular type of network traffic, such as HTTP connections. Using profiles enhances your control over managing network traffic, and makes traffic-management tasks easier and more efficient.

Although it is possible to use the default profiles, we strongly recommend you create new profiles based on the default parent profiles, even if you do not change any of the settings initially. Creating new profiles allows you to easily modify the profile settings specific to this deployment, and ensures you do not accidentally overwrite the default profile.

For the VDI Connection server configuration, we create five new profiles: an HTTP profile, two TCP profiles, a persistence profile, and a OneConnect profile. If you plan on using the BIG-IP LTM system to offload SSL from the Portal devices, make sure to see *Creating a Client SSL profile*.

These profiles use new optimized profiles available in BIG-IP LTM version 9.4 and later. If you are using a BIG-IP LTM version prior to 9.4, the ***Configuration Guide for BIG-IP Local Traffic Management*** for version 9.4 (available on **AskF5**) shows the differences between the base profiles and the optimized profile types. Use this guide to manually configure the optimization settings.

Creating an HTTP profile

The first new profile we create is an HTTP profile. The HTTP profile contains numerous configuration options for how the BIG-IP LTM system handles HTTP traffic. Because the default installation of VDM does not compress data sent to the client, we use a parent profile that includes compression. In this example, we use the **http-wan-optimized-compression-caching parent** profile.

To create a new HTTP profile

1. On the Main tab, expand **Local Traffic**, and then click **Profiles**. The HTTP Profiles screen opens.
2. In the upper right portion of the screen, click the **Create** button. The New HTTP Profile screen opens.
3. In the **Name** box, type a name for this profile. In our example, we type **vdi-http**.
4. From the **Parent Profile** list, select **http-wan-optimized-compression-caching**. The profile settings appear.
5. Check the Custom box for **Redirect Rewrite**, and select **All** from the list.
6. Modify any of the other settings as applicable for your network. In our example, we leave the settings at their default levels.
7. Click the **Finished** button.

Creating the TCP profiles

The next profiles we create are the TCP profiles. If most of the VDI users are connecting via a Local Area Network, we recommend using the **tcp-lan-optimized** parent profile. If the majority of the users are accessing the system from remote or home offices, we recommend using an additional TCP profile, called **tcp-wan-optimized** (for client side TCP connections). In our example, we leave these profiles at their default levels; you can configure any of the options as applicable for your network.

Creating the LAN optimized TCP profile

First we configure the LAN optimized profile. If you are not using version 9.4 or do not want to use this optimized profile, you can choose the default TCP parent profile.

To create a new TCP profile

1. On the Main tab, expand **Local Traffic**, and then click **Profiles**. The HTTP Profiles screen opens.
2. On the Menu bar, from the **Protocol** menu, click **tcp**.
3. In the upper right portion of the screen, click the **Create** button.
4. In the **Name** box, type a name for this profile. In our example, we type **vdi-lan**.
5. From the **Parent Profile** list, select **tcp-lan-optimized** if you are using BIG-IP LTM version 9.4 or later; otherwise select **tcp**.
6. Modify any of the settings as applicable for your network. In our example, we leave the settings at their default levels.
7. Click the **Finished** button.

Creating the WAN optimized TCP profile

Now we configure the WAN optimized profile. Remember, if most of the users are accessing the system over the LAN or other low latency links, you do not need to create this profile.

To create a new TCP WAN optimized profile

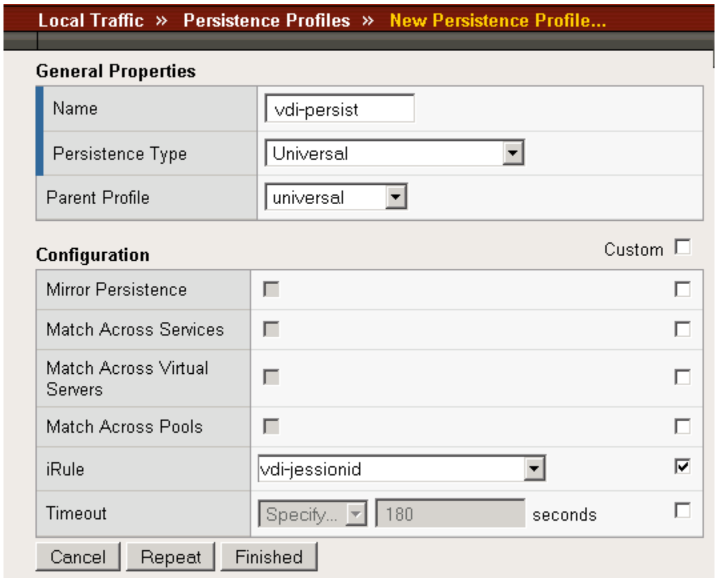
1. On the Main tab, expand **Local Traffic**, and then click **Profiles**.
   The HTTP Profiles screen opens.
2. On the Menu bar, from the **Protocol** menu, click **tcp**.
3. In the upper right portion of the screen, click the **Create** button.
   The New TCP Profile screen opens.
4. In the **Name** box, type a name for this profile. In our example, we type **vdi-wan**.
5. From the **Parent Profile** list, select **tcp-wan-optimized**.
6. Modify any of the settings as applicable for your network. In our example, we leave the settings at their default levels.
7. Click the **Finished** button.

Creating persistence profile

The next profile we create is the persistence profile. This profile references the iRule you created earlier in this guide.

To create a persistence profile

1. On the Main tab, expand **Local Traffic**, and then click **Profiles**.
   The HTTP Profiles screen opens.
2. On the Menu bar, click **Persistence**.
   The Persistence Profiles screen opens.
3. In the upper right portion of the screen, click the **Create** button.
   The New Persistence Profile screen opens.
4. In the **Name** box, type a name for this profile. In our example, we type **vdi-persist**.
5. From the **Persistence Type** list, select **Universal**.
   The configuration options for universal persistence appear.
6. In the **iRule** row, check the Custom box. From the iRule list, select the name of the iRule you created in *Creating the persistence iRule*, on page 6. In our example, we select **vdi-jessionid**.
7. Modify any of the settings as applicable for your network. In our example, we leave the settings at their default levels.
8. Click the **Finished** button.



Local Traffic » Persistence Profiles » New Persistence Profile...

General Properties

Name	vdi-persist
Persistence Type	Universal
Parent Profile	universal

Configuration — Custom □

Mirror Persistence	□	□
Match Across Services	□	□
Match Across Virtual Servers	□	□
Match Across Pools	□	□
iRule	vdi-jessionid	☑
Timeout	Specify... 180 seconds	□

Figure 5 *Creating the persistence profile*

Creating a OneConnect profile

The next profile we create is a OneConnect profile. With OneConnect enabled, client requests can utilize existing, server-side connections, thus reducing the number of server-side connections that a server must open to service those requests. For more information on OneConnect, see the BIG-IP LTM documentation.

In our example, we leave all the options at their default settings. You can configure these options as appropriate for your network.

To create a new OneConnect profile

1. On the Main tab, expand **Local Traffic**, and then click **Profiles**. The HTTP Profiles screen opens.
2. On the Menu bar, from the **Other** menu, click **OneConnect**. The Persistence Profiles screen opens.
3. In the upper right portion of the screen, click the **Create** button. The New HTTP Profile screen opens.
4. In the **Name** box, type a name for this profile. In our example, we type **vdi-oneconnect**.
5. From the **Parent Profile** list, ensure that **oneconnect** is selected.
6. Modify any of the other settings as applicable for your network. In our example, we leave the settings at their default levels.
7. Click the **Finished** button.

Creating a Client SSL profile

The next step in this configuration is to create a Client SSL profile. This profile contains the SSL certificate and Key information for offloading the SSL traffic.

To create a new Client SSL profile based on the default profile

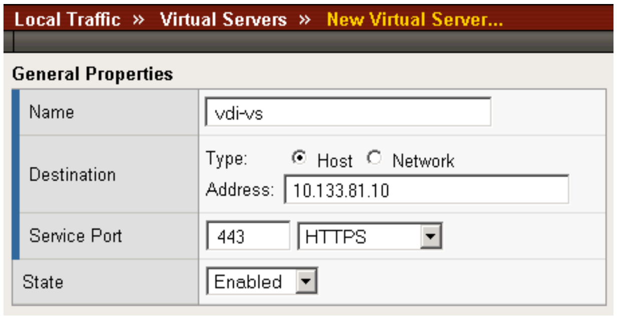
1. On the Main tab, expand **Local Traffic**.
2. Click **Profiles**.
   The HTTP Profiles screen opens.
3. On the Menu bar, from the SSL menu, select **Client**.
   The Client SSL Profiles screen opens.
4. In the upper right portion of the screen, click the **Create** button.
   The New Client SSL Profile screen opens.
5. In the **Name** box, type a name for this profile. In our example, we type **vdi-clientssl**.
6. In the Configuration section, check the **Certificate** and **Key Custom** boxes.
7. From the **Certificate** list, select the name of the Certificate you imported in the *Importing keys and certificates* section.
8. From the **Key** list, select the key you imported in the *Importing keys and certificates* section.
9. Click the **Finished** button.

Creating the virtual server

Next, we configure a virtual server that references the profiles and pool you created in the preceding procedures.

To create the virtual server

1. On the Main tab, expand **Local Traffic**, and then click **Virtual Servers**.
   The Virtual Servers screen opens.
2. In the upper right portion of the screen, click the **Create** button.
   The New Virtual Server screen opens.
3. In the **Name** box, type a name for this virtual server. In our example, we type **vdi-vs**.
4. In the **Destination** section, select the **Host** option button.
5. In the **Address** box, type the IP address of this virtual server. In our example, we use **10.133.81.10**
6. In the **Service Port** box, type **443**, or select **HTTPS** from the list.



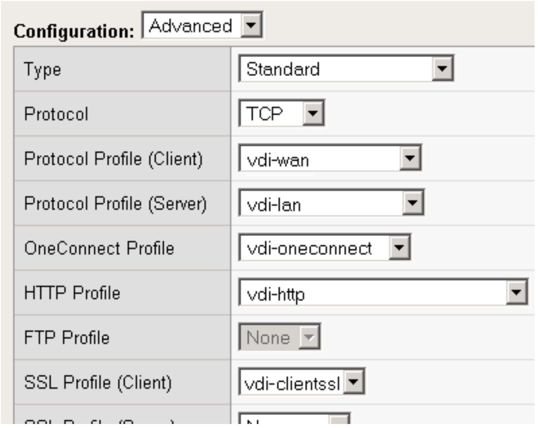
Local Traffic » Virtual Servers » New Virtual Server...

General Properties

Name	vdi-vs
Destination	Type: ● Host ○ Network Address: 10.133.81.10
Service Port	443 HTTPS
State	Enabled

Figure 6 Creating the VDI virtual server

7. From the Configuration list, select **Advanced**.
   The Advanced configuration options appear.
8. Leave the **Type** list at the default setting: **Standard**.
9. From the **Protocol Profile (Client)** list select the name of the profile you created in the *Creating the WAN optimized TCP profile* section. If you did not create a WAN optimized profile, select the LAN optimized profile as in the following Step. In our example, we select **vdi-wan**.
10. From the **Protocol Profile (Server)** list, select the name of the profile you created in the *Creating the LAN optimized TCP profile* section. In our example, we select **vdi-lan**.
11. From the **OneConnect Profile** list, select the name of the profile you created in *Creating a OneConnect profile*. In our example, we select **vdi-oneconnect**.
12. From the HTTP Profile list, select the name of the profile you created in the *Creating an HTTP profile* section. In our example, we select **vdi-http**.
13. From the **SSL Profile (Client)** list, select the profile you created in *Creating a Client SSL profile*. In our example, we select **vdi-clientssl** (see Figure 7).



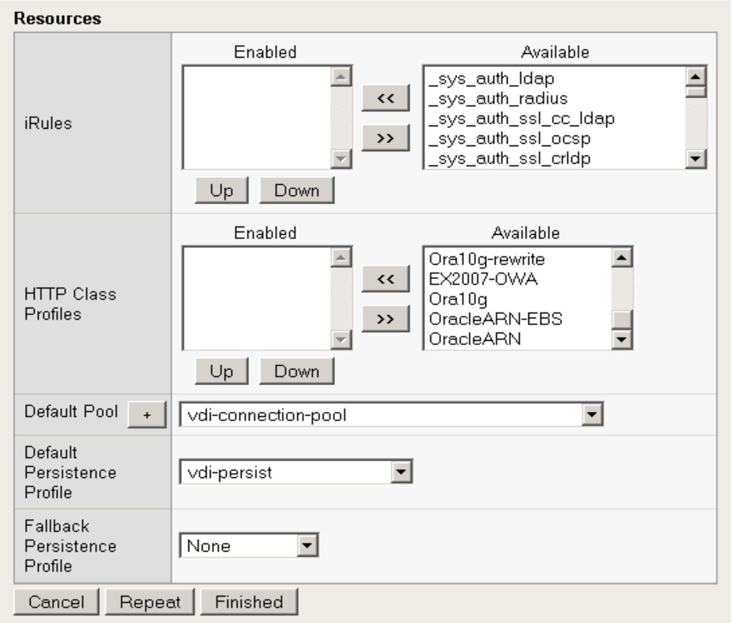
Configuration: Advanced

Type	Standard
Protocol	TCP
Protocol Profile (Client)	vdi-wan
Protocol Profile (Server)	vdi-lan
OneConnect Profile	vdi-oneconnect
HTTP Profile	vdi-http
FTP Profile	None
SSL Profile (Client)	vdi-clientssl

***Figure 7** Selecting the VDI profiles for the virtual server*

14. In the Resources section, from the **Default Pool** list, select the pool you created in the *Creating the Connection server pool* section. In our example, we select **vdi-connection-pool**.

15. From the **Default Persistence Profile** list, select the persistence profile you created in the *Creating persistence profile* section. In our example, we select **vdi-persist**.



Resources

iRules	Enabled: Available: _sys_auth_ldap, _sys_auth_radius, _sys_auth_ssl_cc_ldap, _sys_auth_ssl_ocsp, _sys_auth_ssl_crldp
HTTP Class Profiles	Enabled: Available: Ora10g-rewrite, EX2007-OWA, Ora10g, OracleARN-EBS, OracleARN
Default Pool	vdi-connection-pool
Default Persistence Profile	vdi-persist
Fallback Persistence Profile	None

***Figure 8** Adding the Pool and Persistence profile to the virtual server*

16. Click the **Finished** button.
The BIG-IP LTM configuration for the VDI configuration is now complete.

Appendix A: Backing up and restoring the BIG-IP LTM configuration

We recommend saving your BIG-IP configuration before you begin this deployment. When you save the BIG-IP configuration, it collects the following critical data and compress it into a single User Configuration Set (UCS) file:

- BIG-IP configuration files
- BIG-IP license and passwords
- SSL certificates
- SSH keys

Saving and restoring the BIG-IP LTM configuration

The Configuration Management screen allows you to save and restore all configuration files that you may edit to configure a BIG-IP system. These configuration files are called a User Configuration Set (UCS). The Configuration Management screen contains sections for saving and restoring a configuration. The list boxes in these sections display only files in the **/usr/local/ucs** directory. If you want to save or restore files from another directory, you must type the full path in the box.

To save the BIG-IP configuration using the Configuration utility

1. In the navigation pane, click **System Admin**.
   The User Administration screen displays.
2. Click the Configuration Management tab.
   The Configuration Management screen displays.
3. In the **Save Current Configuration** section, type the path where you want your configuration file saved or choose a path from the list box. If no path is specified, the BIG-IP saves files to **/usr/local/ucs**.
   The BIG-IP appends the extension.ucs to file names without it.
   In our example, we type **pre_vdi_backup.ucs.**
4. Click the **Save** button to save the configuration file.

To restore a BIG-IP configuration

1. In the navigation pane, click **System Admin**.
   The User Administration screen displays.
2. Click the Configuration Management tab.
   The Configuration Management screen displays.

3. In the **Restore a Configuration** section, choose the configuration file you want to restore from the list box, or type the path where your configuration files were saved.
4. Click the **Restore** button.
   To check the status of the restoration, click the **View Log** button. You should wait a few moments for the log file to start generating before you click **View Log**. Repeated clicking of this button will update your screen with the most current log file information until the restoration is complete.