

View Security

VMware Horizon 7 7.0

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View Security

View Security provides a concise reference to the security features of VMware Horizon 7.

- Required system and database login accounts.
- Configuration options and settings that have security implications.
- Resources that must be protected, such as security-relevant configuration files and passwords, and the recommended access controls for secure operation.
- Location of log files and their purpose.
- External interfaces, ports, and services that must be open or enabled for the correct operation of View.

Intended Audience

This information is intended for IT decision makers, architects, administrators, and others who must familiarize themselves with the security components of View.

View Accounts, Resources, and Log Files

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Having different accounts for specific components protects against giving individuals more access and permissions than they need. Knowing the locations of configuration files and other files with sensitive data aids in setting up security for various host systems.

NOTE Starting with Horizon 7.0, View Agent is renamed Horizon Agent.

This chapter includes the following topics:

- “View Accounts,” on page 7
- “View Resources,” on page 8
- “View Log Files,” on page 8

View Accounts

You must set up system and database accounts to administer View components.

Table 1-1. View System Accounts

View Component	Required Accounts
Horizon Client	Configure user accounts in Active Directory for the users who have access to remote desktops and applications. The user accounts must be members of the Remote Desktop Users group, but the accounts do not require View administrator privileges.
vCenter Server	Configure a user account in Active Directory with permission to perform the operations in vCenter Server that are necessary to support View. For information about the required privileges, see the <i>View Installation</i> document.
View Composer	Create a user account in Active Directory to use with View Composer. View Composer requires this account to join linked-clone desktops to your Active Directory domain. The user account should not be a View administrative account. Give the account the minimum privileges that it requires to create and remove computer objects in a specified Active Directory container. For example, the account does not require domain administrator privileges. For information about the required privileges, see the <i>View Installation</i> document.
View Connection Server	When you install View, you can specify a specific domain user, the local Administrators group, or a specific domain user group as View administrators. We recommend creating a dedicated domain user group of View administrators. The default is the currently logged in domain user. In View Administrator, you can use View Configuration > Administrators to change the list of View administrators. See the <i>View Administration</i> document for information about the privileges that are required.

Table 1-2. View Database Accounts

View Component	Required Accounts
View Composer database	An SQL Server or Oracle database stores View Composer data. You create an administrative account for the database that you can associate with the View Composer user account. For information about setting up a View Composer database, see the <i>View Installation</i> document.
Event database used by View Connection Server	An SQL Server or Oracle database stores View event data. You create an administrative account for the database that View Administrator can use to access the event data. For information about setting up a View Composer database, see the <i>View Installation</i> document.

To reduce the risk of security vulnerabilities, take the following actions:

- Configure View databases on servers that are separate from other database servers that your organization uses.
- Do not allow a single user account to access multiple databases.
- Configure separate accounts for access to the View Composer and event databases.

View Resources

View includes several configuration files and similar resources that must be protected.

Table 1-3. View Connection Server and Security Server Resources

Resource	Location	Protection
LDAP settings	Not applicable.	LDAP data is protected automatically as part of role-based access control.
LDAP backup files	%ProgramData%\VMware\VDM\backups	Protected by access control.
locked.properties (secure gateway configuration file)	install_directory\VMware\VMware View\Server\sslgateway\conf	Ensure that this file is secured against access by any user other than View administrators.
absg.properties (Blast Secure Gateway configuration file)	install_directory\VMware\VMware View\Server\appblastgateway	Ensure that this file is secured against access by any user other than View administrators.
Log files	See “ View Log Files ,” on page 8	Protected by access control.
web.xml (Tomcat configuration file)	install_directory\VMware View\Server\broker\web_apps\ROOT\Web INF	Protected by access control.

View Log Files

View creates log files that record the installation and operation of its components.

NOTE View log files are intended for use by VMware Support. VMware recommends that you configure and use the event database to monitor View. For more information, see the *View Installation* and *View Integration* documents.

Table 1-4. View Log Files

View Component	File Path and Other Information
All components (installation logs)	<i>%TEMP%\vminst.log_date_timestamp</i> <i>%TEMP%\vmmsi.log_date_timestamp</i>
Horizon Agent	<p><i><Drive Letter></i>:\ProgramData\VMware\VDM\logs</p> <p>To access View log files that are stored in <i><Drive Letter></i>:\ProgramData\VMware\VDM\logs, you must open the logs from a program with elevated administrator privileges. Right-click the program file and select Run as administrator.</p> <p>If a User Data Disk (UDD) is configured, <i><Drive Letter></i> might correspond to the UDD.</p> <p>The logs for PCoIP are named <i>pcoip_agent*.log</i> and <i>pcoip_server*.log</i>.</p>
View Applications	View Event Database configured on an SQL Server or Oracle database server. Windows Application Event logs. Disabled by default.
View Composer	<p><i>%system_drive%\Windows\Temp\vmware-viewcomposer-ga-new.log</i> on the linked-clone desktop.</p> <p>The View Composer log contains information about the execution of QuickPrep and Sysprep scripts. The log records the start time and end time of script execution, and any output or error messages.</p>
View Connection Server or Security Server	<p><i><Drive Letter></i>:\ProgramData\VMware\VDM\logs.</p> <p>The log directory is configurable in the log configuration settings of the View Common Configuration ADM template file (<i>vdm_common.adm</i>).</p> <p>PCoIP Secure Gateway logs are written to files named <i>SecurityGateway_*.log</i> in the <i>PCoIP Secure Gateway</i> subdirectory.</p> <p>Blast Secure Gateway logs are written to files named <i>absg*.log</i> in the <i>Blast Secure Gateway</i> subdirectory.</p>
View Services	View Event Database configured on an SQL Server or Oracle database server. Windows System Event logs.

View Security Settings

View includes several settings that you can use to adjust the security of the configuration. You can access the settings by using View Administrator or by using the ADSI Edit utility, as appropriate.

NOTE For information about security settings for Horizon Client and Horizon Agent, see the *Horizon Client and Agent Security* document.

This chapter includes the following topics:

- [“Security-Related Global Settings in View Administrator,”](#) on page 12
- [“Security-Related Server Settings in View Administrator,”](#) on page 14
- [“Security-Related Settings in View LDAP,”](#) on page 15

Security-Related Global Settings in View Administrator

Security-related global settings for client sessions and connections are accessible under **View Configuration > Global Settings** in View Administrator.

Table 2-1. Security-Related Global Settings

Setting	Description
Change data recovery password	<p>The password is required when you restore the View LDAP configuration from an encrypted backup.</p> <p>When you install View Connection Server version 5.1 or later, you provide a data recovery password. After installation, you can change this password in View Administrator.</p> <p>When you back up View Connection Server, the View LDAP configuration is exported as encrypted LDIF data. To restore the encrypted backup with the <code>vdmimport</code> utility, you must provide the data recovery password. The password must contain between 1 and 128 characters. Follow your organization's best practices for generating secure passwords.</p>
Message security mode	<p>Determines the security mechanism used when JMS messages are passed between View components.</p> <ul style="list-style-type: none"> ■ If set to Disabled, message security mode is disabled. ■ If set to Enabled, legacy message signing and verification of JMS messages takes place. View components reject unsigned messages. This mode supports a mix of SSL and plain JMS connections. ■ If set to Enhanced, SSL is used for all JMS connections, to encrypt all messages. Access control is also enabled to restrict the JMS topics that View components can send messages to and receive messages from. ■ If set to Mixed, message security mode is enabled, but not enforced for View components that predate View Manager 3.0. <p>The default setting is Enhanced for new installations. If you upgrade from a previous version, the setting used in the previous version is retained.</p> <p>IMPORTANT VMware strongly recommends setting the message security mode to Enhanced after you upgrade all View Connection Server instances, security servers, and View desktops to this release. The Enhanced setting provides many important security improvements and MQ (message queue) updates.</p>
Enhanced Security Status (Read-only)	<p>Read-only field that appears when Message security mode is changed from Enabled to Enhanced. Because the change is made in phases, this field shows the progress through the phases:</p> <ul style="list-style-type: none"> ■ Waiting for Message Bus restart is the first phase. This state is displayed until you manually restart either all View Connection Server instances in the pod or the VMware Horizon View Message Bus Component service on all View Connection Server hosts in the pod. ■ Pending Enhanced is the next state. After all View Message Bus Component services have been restarted, the system begins changing the message security mode to Enhanced for all desktops and security servers. ■ Enhanced is the final state, indicating that all components are now using Enhanced message security mode.
Reauthenticate secure tunnel connections after network interruption	<p>Determines if user credentials must be reauthenticated after a network interruption when Horizon Clients use secure tunnel connections to View desktops and applications.</p> <p>This setting offers increased security. For example, if a laptop is stolen and moved to a different network, the user cannot automatically gain access to the View desktops and applications because the network connection was temporarily interrupted.</p> <p>This setting is disabled by default.</p>
Forcibly disconnect users	<p>Disconnects all desktops and applications after the specified number of minutes has passed since the user logged in to View. All desktops and applications will be disconnected at the same time regardless of when the user opened them.</p> <p>The default is 600 minutes.</p>

Table 2-1. Security-Related Global Settings (Continued)

Setting	Description
<p>For clients that support applications.</p> <p>If the user stops using the keyboard and mouse, disconnect their applications and discard SSO credentials</p>	<p>Protects application sessions when there is no keyboard or mouse activity on the client device. If set to After ... minutes, View disconnects all applications and discards SSO credentials after the specified number of minutes without user activity. Desktop sessions are disconnected. Users must log in again to reconnect to the applications that were disconnected or launch a new desktop or application.</p> <p>If set to Never, View never disconnects applications or discards SSO credentials due to user inactivity.</p> <p>The default is Never.</p>
<p>Other clients.</p> <p>Discard SSO credentials</p>	<p>Discards the SSO credentials after a certain time period. This setting is for clients that do not support application remoting. If set to After ... minutes, users must log in again to connect to a desktop after the specified number of minutes has passed since the user logged in to View, regardless of any user activity on the client device.</p> <p>The default is After 15 minutes.</p>
<p>Enable IPsec for Security Server pairing</p>	<p>Determines whether to use Internet Protocol Security (IPsec) for connections between security servers and View Connection Server instances. This setting must be disabled before installing a security server in FIPS mode; otherwise pairing will fail.</p> <p>By default, IPsec for security server connections is enabled.</p>
<p>View Administrator session timeout</p>	<p>Determines how long an idle View Administrator session continues before the session times out.</p> <p>IMPORTANT Setting the View Administrator session timeout to a high number of minutes increases the risk of unauthorized use of View Administrator. Use caution when you allow an idle session to persist a long time.</p> <p>By default, the View Administrator session timeout is 30 minutes. You can set a session timeout from 1 to 4320 minutes.</p>

For more information about these settings and their security implications, see the *View Administration* document.

NOTE SSL is required for all Horizon Client connections and View Administrator connections to View. If your View deployment uses load balancers or other client-facing, intermediate servers, you can off-load SSL to them and then configure non-SSL connections on individual View Connection Server instances and security servers. See "Off-load SSL Connections to Intermediate Servers" in the *View Administration* document.

Security-Related Server Settings in View Administrator

Security-related server settings are accessible under **View Configuration > Servers** in View Administrator.

Table 2-2. Security-Related Server Settings

Setting	Description
Use PCoIP Secure Gateway for PCoIP connections to machine	<p>Determines whether Horizon Client makes a further secure connection to the View Connection Server or security server host when users connect to View desktops and applications with the PCoIP display protocol.</p> <p>If this setting is disabled, the desktop or application session is established directly between the client and the View desktop or the Remote Desktop Services (RDS) host, bypassing the View Connection Server or security server host.</p> <p>This setting is disabled by default.</p>
Use Secure Tunnel connection to machine	<p>Determines whether Horizon Client makes a further HTTPS connection to the View Connection Server or security server host when users connect to a View desktop or an application.</p> <p>If this setting is disabled, the desktop or application session is established directly between the client and the View desktop or the Remote Desktop Services (RDS) host, bypassing the View Connection Server or security server host.</p> <p>This setting is enabled by default.</p>
Use Blast Secure Gateway for Blast connections to machine	<p>Determines whether clients that use a Web browser or the Blast Extreme display protocol to access desktops use Blast Secure Gateway to establish a secure tunnel to View Connection Server.</p> <p>If not enabled, clients using a Blast Extreme session and Web browsers make direct connections to View desktops, bypassing View Connection Server.</p> <p>This setting is disabled by default.</p>

For more information about these settings and their security implications, see the *View Administration* document.

Security-Related Settings in View LDAP

Security-related settings are provided in View LDAP under the object path `cn=common,ou=global,ou=properties,dc=vdi,dc=vmware,dc=int`. You can use the ADSI Edit utility to change the value of these settings on a View Connection Server instance. The change propagates automatically to all other View Connection Server instances in a group.

Table 2-3. Security-Related Settings in View LDAP

Name-value pair	Description
cs-allowunencryptedstartsession	<p>The attribute is <code>pae-NameValuePair</code>.</p> <p>This attribute controls whether a secure channel is required between a View Connection Server instance and a desktop when a remote user session is being started. When View Agent 5.1 or later, or Horizon Agent 7.0 or later, is installed on a desktop computer, this attribute has no effect and a secure channel is always required. When a View Agent older than View 5.1 is installed, a secure channel cannot be established if the desktop computer is not a member of a domain with a two-way trust to the domain of the View Connection Server instance. In this case, the attribute is important to determine whether a remote user session can be started without a secure channel.</p> <p>In all cases, user credentials and authorization tickets are protected by a static key. A secure channel provides further assurance of confidentiality by using dynamic keys.</p> <p>If set to 0, a remote user session will not start if a secure channel cannot be established. This setting is suitable if all the desktops are in trusted domains or all desktops have View Agent 5.1 or later installed.</p> <p>If set to 1, a remote user session can be started even if a secure channel cannot be established. This setting is suitable if some desktops have older View Agents installed and are not in trusted domains.</p> <p>The default setting is 1.</p>

Ports and Services

Certain UDP and TCP ports must be open so that View components can communicate with each other. Knowing which Windows services run on each type of View server helps identify services that do not belong on the server.

This chapter includes the following topics:

- [“View TCP and UDP Ports,”](#) on page 17
- [“Services on a View Connection Server Host,”](#) on page 21
- [“Services on a Security Server,”](#) on page 22

View TCP and UDP Ports

View uses TCP and UDP ports for network access between its components.

During installation, View can optionally configure Windows firewall rules to open the ports that are used by default. If you change the default ports after installation, you must manually reconfigure Windows firewall rules to allow access on the updated ports. See "Replacing Default Ports for View Services" in the *View Installation* document.

Table 3-1. TCP and UDP Ports Used by View

Source	Port	Target	Port	Protocol	Description
Security server, View Connection Server, or Access Point appliance	55000	Horizon Agent	4172	UDP	PCoIP (not SALSA20) if PCoIP Secure Gateway is used.
Security server, View Connection Server, or Access Point appliance	4172	Horizon Client	*	UDP	PCoIP (not SALSA20) if PCoIP Secure Gateway is used. NOTE Because the target port varies, see the note below this table.
Security server	500	View Connection Server	500	UDP	IPsec negotiation traffic.
Security server	*	View Connection Server	4001	TCP	JMS traffic.

Table 3-1. TCP and UDP Ports Used by View (Continued)

Source	Port	Target	Port	Protocol	Description
Security server	*	View Connection Server	4002	TCP	JMS SSL traffic.
Security server	*	View Connection Server	8009	TCP	AJP13-forwarded Web traffic, if not using IPsec.
Security server	*	View Connection Server	*	ESP	AJP13-forwarded Web traffic, when using IPsec without NAT.
Security server	4500	View Connection Server	4500	UDP	AJP13-forwarded Web traffic, when using IPsec through a NAT device.
Security server, View Connection Server, or Access Point appliance	*	Horizon Agent	3389	TCP	Microsoft RDP traffic to View desktops when tunnel connections are used.
Security server, View Connection Server, or Access Point appliance	*	Horizon Agent	9427	TCP	Windows Media MMR redirection and client drive redirection when tunnel connections are used.
Security server, View Connection Server, or Access Point appliance	*	Horizon Agent	32111	TCP	USB redirection and time zone synchronization when tunnel connections are used.
Security server, View Connection Server, or Access Point appliance	*	Horizon Agent	4172	TCP	PCoIP if PCoIP Secure Gateway is used.
Security server, View Connection Server, or Access Point appliance	*	Horizon Agent	22443	TCP	VMware Blast Extreme if Blast Secure Gateway is used.
Security server, View Connection Server, or Access Point appliance	*	Horizon Agent	22443	TCP	HTML Access if Blast Secure Gateway is used.
Horizon Agent	4172	Horizon Client	*	UDP	PCoIP, if PCoIP Secure Gateway is not used. NOTE Because the target port varies, see the note below this table.

Table 3-1. TCP and UDP Ports Used by View (Continued)

Source	Port	Target	Port	Protocol	Description
Horizon Agent	4172	View Connection Server, security server, or Access Point appliance	55000	UDP	PCoIP (not SALSA20) if PCoIP Secure Gateway is used.
Horizon Agent	4172	Access Point appliance	*	UDP	PCoIP. View desktops and applications send PCoIP data back to an Access Point appliance from UDP port 4172 . The destination UDP port will be the source port from the received UDP packets and so as this is reply data, it is normally unnecessary to add an explicit firewall rule for this.
Horizon Client	*	View Connection Server or security server or Access Point appliance	80	TCP	SSL (HTTPS access) is enabled by default for client connections, but port 80 (HTTP access) can be used in certain cases. See “HTTP Redirection in View,” on page 21.
Horizon Client	*	View Connection Server, security server, or Access Point appliance	443	TCP	HTTPS for logging in to View. (This port is also used for tunnelling when tunnel connections are used.)
Horizon Client	*	View Connection Server or security server or Access Point appliance	4172	TCP and UDP	PCoIP if PCoIP Secure Gateway is used.
Horizon Client	*	Horizon Agent	3389	TCP	Microsoft RDP traffic to View desktops if direct connections are used instead of tunnel connections.
Horizon Client	*	Horizon Agent	9427	TCP	Windows Media MMR redirection and client drive redirection, if direct connections are used instead of tunnel connections.
Horizon Client	*	Horizon Agent	32111	TCP	USB redirection and time zone synchronization if direct connections are used instead of tunnel connections.
Horizon Client	*	Horizon Agent	4172	TCP and UDP	PCoIP if PCoIP Secure Gateway is not used. NOTE Because the source port varies, see the note below this table.
Horizon Client	*	Horizon Agent	22443	TCP and UDP	VMware Blast
Horizon Client	*	View Connection Server, security server, or Access Point appliance	4172	TCP and UDP	PCoIP (not SALSA20) if PCoIP Secure Gateway is used. NOTE Because the source port varies, see the note below this table.
Web Browser	*	Security server or Access Point appliance	8443	TCP	HTML Access.

Table 3-1. TCP and UDP Ports Used by View (Continued)

Source	Port	Target	Port	Protocol	Description
View Connection Server	*	View Connection Server	48080	TCP	For internal communication between View Connection Server components.
View Connection Server	*	vCenter Server or View Composer	80	TCP	SOAP messages if SSL is disabled for access to vCenter Servers or View Composer.
View Connection Server	*	vCenter Server	443	TCP	SOAP messages if SSL is enabled for access to vCenter Servers.
View Connection Server	*	View Composer	18443	TCP	SOAP messages if SSL is enabled for access to View Composer.
View Connection Server	*	View Connection Server	4100	TCP	JMS inter-router traffic.
View Connection Server	*	View Connection Server	4101	TCP	JMS SSL inter-router traffic.
View Connection Server	*	View Connection Server	8472	TCP	For interpod communication in Cloud Pod Architecture.
View Connection Server	*	View Connection Server	22389	TCP	For global LDAP replication in Cloud Pod Architecture.
View Connection Server	*	View Connection Server	22636	TCP	For secure global LDAP replication in Cloud Pod Architecture.
Access Point appliance	*	View Connection Server or load balancer	443	TCP	HTTPS access. Access Point appliances connect on TCP port 443 to communicate with a View Connection Server instance or load balancer in front of multiple View Connection Server instances.
View Composer service	*	ESXi host	902	TCP	Used when View Composer customizes linked-clone disks, including View Composer internal disks and, if they are specified, persistent disks and system disposable disks.

NOTE The UDP port number that clients use for PCoIP might change. If port 50002 is in use, the client will pick 50003. If port 50003 is in use, the client will pick port 50004, and so on. You must configure firewalls with ANY where an asterisk (*) is listed in the table.

HTTP Redirection in View

Connection attempts over HTTP are silently redirected to HTTPS, except for connection attempts to View Administrator. HTTP redirection is not needed with more recent Horizon clients because they default to HTTPS, but it is useful when your users connect with a Web browser, for example to download Horizon Client.

The problem with HTTP redirection is that it is a non-secure protocol. If a user does not form the habit of entering **https://** in the address bar, an attacker can compromise the Web browser, install malware, or steal credentials, even when the expected page is correctly displayed.

NOTE HTTP redirection for external connections can take place only if you configure your external firewall to allow inbound traffic to TCP port 80.

Connection attempts over HTTP to View Administrator are not redirected. Instead, an error message is returned indicating that you must use HTTPS.

To prevent redirection for all HTTP connection attempts, see "Prevent HTTP Redirection for Client Connections to Connection Server" in the *View Installation* document.

Connections to port 80 of a View Connection Server instance or security server can also take place if you off-load SSL client connections to an intermediate device. See "Off-load SSL Connections to Intermediate Servers" in the *View Administration* document.

To allow HTTP redirection when the SSL port number was changed, see "Change the Port Number for HTTP Redirection to Connection Server" in the *View Installation* document.

Services on a View Connection Server Host

The operation of View depends on several services that run on a View Connection Server host.

Table 3-2. View Connection Server Host Services

Service Name	Startup Type	Description
VMware Horizon View Blast Secure Gateway	Automatic	Provides secure HTML Access and Blast Extreme services. This service must be running if clients connect to View Connection Server through the Blast Secure Gateway.
VMware Horizon View Connection Server	Automatic	Provides connection broker services. This service must always be running. If you start or stop this service, it also starts or stops the Framework, Message Bus, Security Gateway, and Web services. This service does not start or stop the VMwareVDMDS service or the VMware Horizon View Script Host service.
VMware Horizon View Framework Component	Manual	Provides event logging, security, and COM+ framework services. This service must always be running.
VMware Horizon View Message Bus Component	Manual	Provides messaging services between the View components. This service must always be running.
VMware Horizon View PCoIP Secure Gateway	Manual	Provides PCoIP Secure Gateway services. This service must be running if clients connect to View Connection Server through the PCoIP Secure Gateway.
VMware Horizon View Script Host	Disabled	Provides support for third-party scripts that run when you delete virtual machines. This service is disabled by default. You should enable this service if you want to run scripts.
VMware Horizon View Security Gateway Component	Manual	Provides common gateway services. This service must always be running.

Table 3-2. View Connection Server Host Services (Continued)

Service Name	Startup Type	Description
VMware Horizon View Web Component	Manual	Provides web services. This service must always be running.
VMwareVDMDS	Automatic	Provides LDAP directory services. This service must always be running. During upgrades of View, this service ensures that existing data is migrated correctly.

Services on a Security Server

The operation of View depends on several services that run on a security server.

Table 3-3. Security Server Services

Service Name	Startup Type	Description
VMware Horizon View Blast Secure Gateway	Automatic	Provides secure HTML Access and Blast Extreme services. This service must be running if clients connect to this security server through the Blast Secure Gateway.
VMware Horizon View Security Server	Automatic	Provides security server services. This service must always be running. If you start or stop this service, it also starts or stops the Framework and Security Gateway services.
VMware Horizon View Framework Component	Manual	Provides event logging, security, and COM+ framework services. This service must always be running.
VMware Horizon View PCoIP Secure Gateway	Manual	Provides PCoIP Secure Gateway services. This service must be running if clients connect to this security server through the PCoIP Secure Gateway.
VMware Horizon View Security Gateway Component	Manual	Provides common gateway services. This service must always be running.

Configuring Security Protocols and Cipher Suites on a View Connection Server Instance or on a Security Server

4

You can configure the security protocols and cipher suites that are accepted by View Connection Server. You can define a global acceptance policy that applies to all View Connection Server instances in a replicated group, or you can define an acceptance policy for individual View Connection Server instances and security servers.

You also can configure the security protocols and cipher suites that View Connection Server instances propose when connecting to vCenter Server and View Composer. You can define a global proposal policy that applies to all View Connection Server instances in a replicated group. You cannot define individual instances to opt out of a global proposal policy.

NOTE The security settings for View Connection Server do not apply to Blast Secure Gateway (BSG). You must configure security for BSG separately. See [Chapter 5, “Configuring Security Protocols and Cipher Suites for Blast Secure Gateway,”](#) on page 29.

Oracle's Unlimited Strength Jurisdiction Policy files are included as standard, allowing 256-bit keys by default.

This chapter includes the following topics:

- [“Default Global Policies for Security Protocols and Cipher Suites,”](#) on page 24
- [“Configuring Global Acceptance and Proposal Policies,”](#) on page 24
- [“Configure Acceptance Policies on Individual View Servers,”](#) on page 25
- [“Configure Proposal Policies on View Desktops,”](#) on page 26
- [“Older Protocols and Ciphers Disabled in View,”](#) on page 27

Default Global Policies for Security Protocols and Cipher Suites

Global acceptance and proposal policies enable certain security protocols and cipher suites by default.

Table 4-1. Default Global Policies

Default Security Protocols	Default Cipher Suites
<ul style="list-style-type: none"> ■ TLS 1.2 ■ TLS 1.1 ■ TLS 1.0 	<ul style="list-style-type: none"> ■ TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 ■ TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 ■ TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256 ■ TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA ■ TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384 ■ TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA ■ TLS_RSA_WITH_AES_128_CBC_SHA ■ TLS_RSA_WITH_AES_256_CBC_SHA

If all connecting clients support TLS 1.1 and/or TLS 1.2, you can remove TLS 1.0 from the acceptance policy.

Configuring Global Acceptance and Proposal Policies

Global acceptance and proposal policies are defined in View LDAP attributes. These policies apply to all View Connection Server instances and security servers in a replicated group. To change a global policy, you can edit View LDAP on any View Connection Server instance.

Each policy is a single-valued attribute in the following View LDAP location:

```
cn=common,ou=global,ou=properties,dc=vdi,dc=vmware,dc=int
```

Global Acceptance and Proposal Policies Defined in View LDAP

You can edit the View LDAP attributes that define global acceptance and proposal policies.

Global Acceptance Polices

The following attribute lists security protocols. You must order the list by placing the latest protocol first:

```
pae-ServerSSLSecureProtocols = \LIST:TLSv1.2,TLSv1.1,TLSv1
```

The following attribute lists the cipher suites. The order of the cipher suites is unimportant. This example shows an abbreviated list:

```
pae-ServerSSLCipherSuites
= \LIST:TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256,TLS_RSA_WITH_AES_128_CBC_SHA
```

Global Proposal Policies

The following attribute lists security protocols. You must order the list by placing the latest protocol first:

```
pae-ClientSSLSecureProtocols = \LIST:TLSv1.2,TLSv1.1,TLSv1
```

The following attribute lists the cipher suites. This list should be in order of preference. Place the most preferred cipher suite first, the second-most preferred suite next, and so on. This example shows an abbreviated list:

```
pae-ClientSSLCipherSuites
= \LIST:TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256,TLS_RSA_WITH_AES_128_CBC_SHA
```

Change the Global Acceptance and Proposal Policies

To change the global acceptance and proposal policies for security protocols and cipher suites, you use the ADSI Edit utility to edit View LDAP attributes.

Prerequisites

- Familiarize yourself with the View LDAP attributes that define the acceptance and proposal policies. See [“Global Acceptance and Proposal Policies Defined in View LDAP,”](#) on page 24.
- See the Microsoft TechNet Web site for information on how to use the ADSI Edit utility on your Windows Server operating system version.

Procedure

- 1 Start the ADSI Edit utility on your View Connection Server computer.
- 2 In the console tree, select **Connect to**.
- 3 In the **Select or type a Distinguished Name or Naming Context** text box, type the distinguished name **DC=vdi, DC=vmware, DC=int**.
- 4 In the **Select or type a domain or server** text box, select or type **localhost:389** or the fully qualified domain name (FQDN) of the View Connection Server computer followed by port 389.
For example: **localhost:389** or **mycomputer.mydomain.com:389**
- 5 Expand the ADSI Edit tree, expand **OU=Properties**, select **OU=Global**, and select **OU=Common** in the right pane.
- 6 On the object **CN=Common, OU=Global, OU=Properties**, select each attribute that you want to change and type the new list of security protocols or cipher suites.
- 7 Restart the Windows service VMware Horizon View Security Gateway Component on each Connection Server instance and security server if you modified `pae-ServerSSLSecureProtocols`.

You do not need to restart any service after modifying `pae-ClientSSLSecureProtocols`.

Configure Acceptance Policies on Individual View Servers

To specify a local acceptance policy on an individual View Connection Server instance or security server, you must add properties to the `locked.properties` file. If the `locked.properties` file does not yet exist on the View server, you must create it.

You add a `secureProtocols.n` entry for each security protocol that you want to configure. Use the following syntax: `secureProtocols.n=security protocol`.

You add an `enabledCipherSuite.n` entry for each cipher suite that you want to configure. Use the following syntax: `enabledCipherSuite.n=cipher suite`.

The variable `n` is an integer that you add sequentially (1, 2, 3) to each type of entry.

Make sure that the entries in the `locked.properties` file have the correct syntax and the names of the cipher suites and security protocols are spelled correctly. Any errors in the file can cause the negotiation between the client and server to fail.

Procedure

- 1 Create or edit the `locked.properties` file in the SSL gateway configuration folder on the View Connection Server or security server computer.

For example: `install_directory\VMware\VMware View\Server\sslgateway\conf\`

- 2 Add `secureProtocols.n` and `enabledCipherSuite.n` entries, including the associated security protocols and cipher suites.
- 3 Save the `locked.properties` file.
- 4 Restart the VMware Horizon View Connection Server service or VMware Horizon View Security Server service to make your changes take effect.

Example: Default Acceptance Policies on an Individual Server

The following example shows the entries in the `locked.properties` file that are needed to specify the default policies:

The following list should be ordered with the latest protocol first:

```
secureProtocols.1=TLSv1.2
secureProtocols.2=TLSv1.1
secureProtocols.3=TLSv1
```

This setting must be the latest protocol given in the list above:

```
preferredSecureProtocol=TLSv1.2
```

The order of the following list is unimportant:

```
enabledCipherSuite.1=TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
enabledCipherSuite.2=TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA
enabledCipherSuite.3=TLS_RSA_WITH_AES_128_CBC_SHA256
enabledCipherSuite.4=TLS_RSA_WITH_AES_128_CBC_SHA
```

Configure Proposal Policies on View Desktops

You can control the security of Message Bus connections to View Connection Server by configuring the proposal policies on View desktops that run Windows.

Make sure that View Connection Server is configured to accept the same policies to avoid a connection failure.

Procedure

- 1 Start the Windows Registry Editor on the View desktop.
- 2 Navigate to the `HKEY_LOCAL_MACHINE\Software\VMware, Inc.\VMware VDM\Agent\Configuration` registry key.
- 3 Add a new String (REG_SZ) value, `ClientSSLSecureProtocols`.
- 4 Set the value to a list of cipher suites in the format `\LIST:protocol_1,protocol_2,....`
List the protocols with the latest protocol first. For example:
`\LIST:TLSv1.2,TLSv1.1,TLSv1`
- 5 Add a new String (REG_SZ) value, `ClientSSLCipherSuites`.
- 6 Set the value to a list of cipher suites in the format `\LIST:cipher_suite_1,cipher_suite_2,....`
The list should be in order of preference, with the most preferred cipher suite first. For example:
`\LIST:TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256,TLS_RSA_WITH_AES_128_CBC_SHA`

Older Protocols and Ciphers Disabled in View

Some older protocols and ciphers that are no longer considered secure are disabled in View by default. If required, you can enable them manually.

DHE Cipher Suites

For more information, see <http://kb.vmware.com/kb/2121183>. Cipher suites that are compatible with DSA certificates use Diffie-Hellman ephemeral keys, and these suites are no longer enabled by default, starting with Horizon 6 version 6.2.

For Connection Server instances, security servers, and View desktops, you can enable these cipher suites by editing the View LDAP database, `locked.properties` file, or registry, as described in this guide. See “[Change the Global Acceptance and Proposal Policies](#),” on page 25, “[Configure Acceptance Policies on Individual View Servers](#),” on page 25, and “[Configure Proposal Policies on View Desktops](#),” on page 26. You can define a list of cipher suites that includes one or more of the following suites, in this order:

- TLS_DHE_DSS_WITH_AES_128_GCM_SHA256 (TLS 1.2 only, not FIPS)
- TLS_DHE_DSS_WITH_AES_256_GCM_SHA384 (TLS 1.2 only, not FIPS)
- TLS_DHE_DSS_WITH_AES_128_CBC_SHA256 (TLS 1.2 only)
- TLS_DHE_DSS_WITH_AES_128_CBC_SHA
- TLS_DHE_DSS_WITH_AES_256_CBC_SHA256 (TLS 1.2 only)
- TLS_DHE_DSS_WITH_AES_256_CBC_SHA

For View Composer and View Agent Direct-Connection (VADC) machines, you can enable DHE cipher suites by adding the following to the list of ciphers when you follow the procedure “Disable Weak Ciphers in SSL/TLS for View Composer and Horizon Agent Machines” in the *View Installation* document.

```
TLS_DHE_RSA_WITH_AES_256_GCM_SHA384
TLS_DHE_RSA_WITH_AES_128_GCM_SHA256
```

NOTE It is not possible to enable support for ECDSA certificates. These certificates have never been supported.

SSLv3

In Horizon 7, SSL version 3.0 has been removed.

For more information, see <http://tools.ietf.org/html/rfc7568>.

RC4

For more information, see <http://tools.ietf.org/html/rfc7465>.

For Connection Server instances, security servers, and View desktops, you can enable RC4 on a Connection Server, security server, or a Horizon Agent machine by editing the configuration file `C:\Program Files\VMware\VMware View\Server\jre\lib\security\java.security`. At the end of the file is a multi-line entry called `jdk.tls.legacyAlgorithms`. Remove `RC4_128` and the comma that follows it from this entry and restart the Connection Server, security server, or the Horizon Agent machine, as the case may be.

For View Composer and View Agent Direct-Connection (VADC) machines, you can enable RC4 by adding the following to the list of ciphers when you follow the procedure “Disable Weak Ciphers in SSL/TLS for View Composer and Horizon Agent Machines” in the *View Installation* document.

```
TLS_RSA_WITH_RC4_128_SHA
```

TLS 1.0

In Horizon 7, TLS 1.0 is disabled by default.

For more information, see https://www.pcisecuritystandards.org/documents/PCI_DSS_v3-1.pdf and <http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-52r1.pdf>. For instructions on how to enable TLS 1.0, see the sections "Enable TLSv1 on vCenter Connections from Connection Server" and "Enable TLSv1 on vCenter and ESXi Connections from View Composer" in the *View Upgrades* document.

Configuring Security Protocols and Cipher Suites for Blast Secure Gateway

5

The security settings for View Connection Server do not apply to Blast Secure Gateway (BSG). You must configure security for BSG separately.

Configure Security Protocols and Cipher Suites for Blast Secure Gateway (BSG)

You can configure the security protocols and cipher suites that BSG's client-side listener accepts by editing the file `absg.properties`.

The protocols that are allowed are, from low to high, `tls1.0`, `tls1.1`, and `tls1.2`. Older protocols such as SSLv3 and earlier are never allowed. Two properties, `localHttpsProtocolLow` and `localHttpsProtocolHigh`, determine the range of protocols that the BSG listener will accept. For example, setting `localHttpsProtocolLow=tls1.0` and `localHttpsProtocolHigh=tls1.2` will cause the listener to accept `tls1.0`, `tls1.1`, and `tls1.2`. The default settings are `localHttpsProtocolLow=tls1.1` and `localHttpsProtocolHigh=tls1.2`. You can examine the BSG's `absg.log` file to discover the values that are in force for a specific BSG instance.

You must specify the list of ciphers using the format that is defined in <http://openssl.org/docs/manmaster/apps/ciphers.html>, under the section CIPHER LIST FORMAT. The following cipher list is the default:

```
ECDHE-RSA-AES256-SHA:AES256-SHA:HIGH:!AESGCM:!CAMELLIA:!3DES:!EDH:!EXPORT:!MD5:!PSK:!RC4:!SRP:!aNULL:!eNULL
```

Procedure

- 1 On the Connection Server instance, edit the file `install_directory\VMware\VMware View\Server\appblastgateway\absg.properties`.
By default, the install directory is `%ProgramFiles%`.
- 2 Edit the properties `localHttpsProtocolLow` and `localHttpsProtocolHigh` to specify a range of protocols.

For example,

```
localHttpsProtocolLow=tls1.0  
localHttpsProtocolHigh=tls1.2
```

To enable only one protocol, specify the same protocol for both `localHttpsProtocolLow` and `localHttpsProtocolHigh`.

- 3 Edit the `localHttpsCipherSpec` property to specify a list of cipher suites.

For example,

```
localHttpsCipherSpec=ECDHE-RSA-AES256-SHA:HIGH:!AESGCM:!CAMELLIA:!3DES:!EDH:!EXPORT:!MD5:!  
PSK:!RC4:!SRP:!aNULL:!eNULL
```

- 4 Restart the Windows service VMware Horizon View Blast Secure Gateway.

Deploying USB Devices in a Secure View Environment

6

USB devices can be vulnerable to a security threat called BadUSB, in which the firmware on some USB devices can be hijacked and replaced with malware. For example, a device can be made to redirect network traffic or to emulate a keyboard and capture keystrokes. You can configure the USB redirection feature to protect your View deployment against this security vulnerability.

By disabling USB redirection, you can prevent any USB devices from being redirected to your users' View desktops and applications. Alternatively, you can disable redirection of specific USB devices, allowing users to have access only to specific devices on their desktops and applications.

The decision whether to take these steps depends on the security requirements in your organization. These steps are not mandatory. You can install USB redirection and leave the feature enabled for all USB devices in your View deployment. At a minimum, consider seriously the extent to which your organization should try to limit its exposure to this security vulnerability.

This chapter includes the following topics:

- [“Disabling USB Redirection for All Types of Devices,”](#) on page 31
- [“Disabling USB Redirection for Specific Devices,”](#) on page 32

Disabling USB Redirection for All Types of Devices

Some highly secure environments require you to prevent all USB devices that users might have connected to their client devices from being redirected to their remote desktops and applications. You can disable USB redirection for all desktop pools, for specific desktop pools, or for specific users in a desktop pool.

Use any of the following strategies, as appropriate for your situation:

- When you install Horizon Agent on a desktop image or RDS host, deselect the **USB redirection** setup option. (The option is deselected by default.) This approach prevents access to USB devices on all remote desktops and applications that are deployed from the desktop image or RDS host.
- In View Administrator, edit the **USB access** policy for a specific pool to either deny or allow access. With this approach, you do not have to change the desktop image and can control access to USB devices in specific desktop and application pools.

Only the global **USB access** policy is available for RDS desktop and application pools. You cannot set this policy for individual RDS desktop or application pools.

- In View Administrator, after you set the policy at the desktop or application pool level, you can override the policy for a specific user in the pool by selecting the **User Overrides** setting and selecting a user.
- Set the Exclude All Devices policy to **true**, on the Horizon Agent side or on the client side, as appropriate.

- Use Smart Policies to create a policy that disables the **USB redirection** Horizon Policy setting. With this approach, you can disable USB redirection on a specific remote desktop if certain conditions are met. For example, you can configure a policy that disables USB redirection when users connect to a remote desktop from outside your corporate network.

If you set the `Exclude All Devices` policy to **true**, Horizon Client prevents all USB devices from being redirected. You can use other policy settings to allow specific devices or families of devices to be redirected. If you set the policy to **false**, Horizon Client allows all USB devices to be redirected except those that are blocked by other policy settings. You can set the policy on both Horizon Agent and Horizon Client. The following table shows how the `Exclude All Devices` policy that you can set for Horizon Agent and Horizon Client combine to produce an effective policy for the client computer. By default, all USB devices are allowed to be redirected unless otherwise blocked.

Table 6-1. Effect of Combining Exclude All Devices Policies

Exclude All Devices Policy on Horizon Agent	Exclude All Devices Policy on Horizon Client	Combined Effective Exclude All Devices Policy
false or not defined (include all USB devices)	false or not defined (include all USB devices)	Include all USB devices
false (include all USB devices)	true (exclude all USB devices)	Exclude all USB devices
true (exclude all USB devices)	Any or not defined	Exclude all USB devices

If you have set `Disable Remote Configuration Download` policy to **true**, the value of `Exclude All Devices` on Horizon Agent is not passed to Horizon Client, but Horizon Agent and Horizon Client enforce the local value of `Exclude All Devices`.

These policies are included in the Horizon Agent Configuration ADM template file (`vdm_agent.adm`). For more information, see "USB Settings in the Horizon Agent Configuration ADM Template" in the *Setting Up Desktop and Application Pools in View* document.

Disabling USB Redirection for Specific Devices

Some users might have to redirect specific locally-connected USB devices so that they can perform tasks on their remote desktops or applications. For example, a doctor might have to use a Dictaphone USB device to record patients' medical information. In these cases, you cannot disable access to all USB devices. You can use group policy settings to enable or disable USB redirection for specific devices.

Before you enable USB redirection for specific devices, make sure that you trust the physical devices that are connected to client machines in your enterprise. Be sure that you can trust your supply chain. If possible, keep track of a chain of custody for the USB devices.

In addition, educate your employees to ensure that they do not connect devices from unknown sources. If possible, restrict the devices in your environment to those that accept only signed firmware updates, are FIPS 140-2 Level 3-certified, and do not support any kind of field-updatable firmware. These types of USB devices are hard to source and, depending on your device requirements, might be impossible to find. These choices might not be practical, but they are worth considering.

Each USB device has its own vendor and product ID that identifies it to the computer. By configuring Horizon Agent Configuration group policy settings, you can set an include policy for known device types. With this approach, you remove the risk of allowing unknown devices to be inserted into your environment.

For example, you can prevent all devices except a known device vendor and product ID, vid/pid=0123/abcd, from being redirected to the remote desktop or application:

```
ExcludeAllDevices    Enabled
IncludeVidPid        o:vid-0123_pid-abcd
```

NOTE This example configuration provides protection, but a compromised device can report any vid/pid, so a possible attack could still occur.

By default, View blocks certain device families from being redirected to the remote desktop or application. For example, HID (human interface devices) and keyboards are blocked from appearing in the guest. Some released BadUSB code targets USB keyboard devices.

You can prevent specific device families from being redirected to the remote desktop or application. For example, you can block all video, audio, and mass storage devices:

```
ExcludeDeviceFamily  o:video;audio;storage
```

Conversely, you can create a whitelist by preventing all devices from being redirected but allowing a specific device family to be used. For example, you can block all devices except storage devices:

```
ExcludeAllDevices    Enabled
IncludeDeviceFamily  o:storage
```

Another risk can arise when a remote user logs into a desktop or application and infects it. You can prevent USB access to any View connections that originate from outside the company firewall. The USB device can be used internally but not externally.

Be aware that if you block TCP port 32111 to disable external access to USB devices, time zone synchronization will not work because port 32111 is also used for time zone synchronization. For zero clients, the USB traffic is embedded inside a virtual channel on UDP port 4172. Because port 4172 is used for the display protocol as well as for USB redirection, you cannot block port 4172. If required, you can disable USB redirection on zero clients. For details, see the zero client product literature or contact the zero client vendor.

Setting policies to block certain device families or specific devices can help to mitigate the risk of being infected with BadUSB malware. These policies do not mitigate all risk, but they can be an effective part of an overall security strategy.

These policies are included in the Horizon Agent Configuration ADM template file (`vdm_agent.adm`). For more information, see "USB Settings in the Horizon Agent Configuration ADM Template" in the *Setting Up Desktop and Application Pools in View* document.

HTTP Protection Measures on Connection Servers and Security Servers

7

View employs certain measures to protect communication that uses the HTTP protocol.

This chapter includes the following topics:

- [“Internet Engineering Task Force Standards,”](#) on page 35
- [“Other Protection Measures,”](#) on page 36

Internet Engineering Task Force Standards

View Connection Server and security server comply with certain Internet Engineering Task Force (IETF) Standards.

- RFC 5746 Transport Layer Security (TLS) – Renegotiation Indication Extension, also known as secure renegotiation, is enabled by default.

NOTE Client-initiated renegotiation is disabled by default on Connection Servers and security servers. To enable, edit registry value [HKLM\SOFTWARE\VMware, Inc.\VMware VDM\plugins\wsnm\TunnelService\Params]JvmOptions and remove **-Djdk.tls.rejectClientInitiatedRenegotiation=true** from the string.

- RFC 6797 HTTP Strict Transport Security (HSTS), also known as transport security, is enabled by default.
- RFC 7034 HTTP Header Field X-Frame-Options, also known as counter clickjacking, is enabled by default. You can disable it by adding the entry `x-frame-options=OFF` to the file `locked.properties`. For information on how to add properties to the file `locked.properties`, see [“Configure Acceptance Policies on Individual View Servers,”](#) on page 25.

Changing this option does not affect connections to HTML Access.

Origin Checking

RFC 6454 Origin Checking, which protects against cross-site request forging, is enabled by default.

NOTE In earlier releases, this protection was disabled by default.

You can disable this protection by adding the following entry to the file `locked.properties`:

```
checkOrigin=false
```

If multiple Connection Servers or security servers are load balanced, you must specify the load balancer address by adding the following entry to the file `locked.properties`. Port 443 is assumed for this address.

```
balancedHost=load-balancer-name
```

If clients will be connecting through Access Point, you must specify the Access Point addresses in the file `locked.properties`. Port 443 is assumed for these addresses. For example:

```
portalHost.1=access-point-name-1
portalHost.2=access-point-name-2
```

Do the same if you want to provide access to a Connection Server or security server by a name that is different from the one that is specified in the External URL.

When this option is enabled, connections to View can be made only to the address given in the external URL, to the `balancedHost` address, any `portalHost` address, or to `localhost`.

Other Protection Measures

Besides the Internet Engineering Task Force standards, View employs other measures to protect communication that uses the HTTP protocol.

Reducing MIME Type Security Risks

By default, View sends the header `x-content-type-options: nosniff` in its HTTP responses to help prevent attacks based on MIME-type confusion.

You can disable this feature by adding the following entry to the file `locked.properties`:

```
x-content-type-options=OFF
```

Mitigating Cross-Site Scripting Attacks

By default, View employs the XSS (cross-site scripting) Filter feature to mitigate cross-site scripting attacks by sending the header `x-xss-protection=1; mode=block` in its HTTP responses.

You can disable this feature by adding the following entry to the file `locked.properties`:

```
x-xss-protection=OFF
```

Content Type Checking

By default, View accepts requests with the following declared content types only:

- `application/x-www-form-urlencoded`
- `application/xml`
- `text/xml`

NOTE In earlier releases, this protection was disabled by default.

To restrict the content types that View accepts, add the following entry to the file `locked.properties`:

```
acceptContentType.1=content-type
```

For example:

```
acceptContentType.1=x-www-form-urlencoded
```

To accept another content type, add the entry `acceptContentType.2=content-type`, and so on

To accept requests with any declared content type, specify `acceptContentType=*`.

Changing this list does not affect connections to View Administrator.

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