

VistA Blood Establishment Computer Software (VBECS) Version 2.3.0

Technical Manual-Security Guide

September 2018

Department of Veterans Affairs Enterprise Project Management Office

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VistA Blood Establishment Computer Software (VBECS) Version 2.3.0 Technical Manual-Security Guide Version 2.0 This page intentionally left blank.

Revision History

Date	Revision	Description	Author
		Modified VistA Blood Establishment Computer Software (VBECS) 2.2.1 Technical Manual-Security Guide, Version 2.0 to create the VistA Blood Establishment Computer Software (VBECS) 2.3.0 Technical Manual-Security Guide, Version 1.0.	
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Introduction

The main purpose of the VistA Blood Establishment Computer Software (VBECS) is to automate the daily processing of blood inventory and patient transfusions in a hospital transfusion service.

 \mathfrak{M} Unauthorized access or misuse of this system and/or its data is a federal crime. Use of all data, printed or electronic, must be in accordance with VA policy on security and privacy.

Provide the system! The U.S. Food and Drug Administration classifies this software as a medical device. Unauthorized modifications will render this device an adulterated medical device under Section 501 of the Medical Device Amendments to the Federal Food, Drug, and Cosmetic Act. Acquiring and implementing this software through the Freedom of Information Act require the implementer to assume total responsibility for the software and become a registered manufacturer of a medical device, subject to FDA regulations. Adding to or updating VBECS software without permission is prohibited.

VBECS Version Numbers

In previous VBECS patch releases, the user documentation referred to the VBECS version in a 4-digit format (e.g., 2.1.0.2 – where 2.1.0 represents the patch version and the last digit (2) is the patch build number).

The VBECS version (Figure 1) is now represented with only the first three digits (e.g., 2.1.0) and appears that way in all user documentation to simplify readability

The revision letter tracks database-only updates (e.g., blood product table updates, canned comments updates). The revision letter is normally a single alpha character (e.g., C), but can be two characters (e.g., AA, AB, AC) in the unlikely event that more than 25 database updates are made before a code change is implemented. The revision letter starts at A with each new code change and is incremented to B when the first database-only update is made. The revision letter is then updated by one character in the alphabet for every successive database-only update until a new code change is implemented, at which time the revision letter reverts back to A. The version submitted for system testing is revision A, but the version customers receive can be revision A, B or a higher revision letter.

Figure 1: Example of Help, About VBECS

👌 About Vist	A Blood Establishment Computer Software (VBECS)
6	About
	11231
	VistA Blood Establishment Computer Software (VBECS)
	Version 2.3.0
Self-	Developed by the Department of Veterans Affairs
1 BB	Compiled 2018-02-07 15:46
-	OS Version Microsoft Windows NT 6.1.7601 Service Pack 1
	CLR Version 4.0.30319.42000
	Environment R05ISHVNNVBE2T1.VHA.MED.VA.GOV.VBECS_DEV2302_TEST
	Build 0202.0001.5829.46490 Revision A
	FDA UDI 00860271000907
	VBECS Manufacturer 1st Ave N of 22nd St Bldg 37, Hines, IL 60141 Address
Unauthorized	access or misuse of this system and/or its data is a federal crime. Use of all data shall ance with VA policy on security and privacy
Note: The U.S Unauthorized the Medical D implementing assume total device, subje	S. Food and Drug Administration classifies this software as a medical device. modifications will render this device an adulterated medical device under Section 501 of Device Amendments to the Federal Food, Drug, and Cosmetic Act. Acquiring and this software through the Freedom of Information Act require the implementer to responsibility for the software and become a registered manufacturer of a medical ct to FDA regulations.
	<u>o</u> k

The VBECS Administrator and VBECS applications, when started, will verify that the application code (binary build number) matches the SQL Server code (database build number) in order to ensure that application servers and SQL servers are patched and remain in sync with each other. In the rare event that they fall out of sync, the applications will present the following error message (Figure 2) and close until both the code and the database are in sync.

Figure 2: Example of System Error



Related Manuals and Reference Materials

HL7 V2.3.1 Implementation Guide

CPRS-VBECS Interface (OR*3.0*212) Release Notes April 2009 PIMS V. 5.3 Technical Manual Duplicate Record Merge: Patient Merge Technical Manual Version 7.3 April 1998 Revised December 2010 Kernel Systems Manual Version 8.0, Chapter 1: Sign-On Security/User Interface, pp. 13–20 <u>Manage Open Sessions and Files in Windows 2008 R2</u> Health Product Support Release of Products and Patches Guide V2.3 Updated: February 2014 VistA Blood Establishment Computer Software (VBECS) 2.3.0 User Guide VistA Blood Establishment Computer Software (VBECS) – sinstrument> Configuration and Setup Guide VistA Blood Establishment Computer Software (VBECS) – sinstrument> Configuration and Setup Guide VistALink Version 1.5 Developer-System Manager Manual, Chapter 6: Security Management, pp. 34–35 Windows Server 2008R2 Security Guide, Microsoft Corporation This page intentionally left blank.

How This Technical Manual-Security Guide Is Organized

Outlined text is used throughout this guide to highlight warnings, limitations, and cautions:

Warnings, limitations, cautions

Terms

For consistency and space considerations, the pronouns "he," "him," and "his" are used as pronouns of indeterminate gender equally applicable to males and females.

In many instances, a user may scan a barcode or enter data manually (by typing). The term "enter" is used throughout this guide to mean "enter manually."

See the Glossary for definitions of other terms and acronyms used in this guide.

Figures and Tables

If you refer to figures and tables from the Technical Manual-Security Guide in your local policy and procedure documents, you may wish to use their titles only, without figure or table numbers: as the technical manual-security guide is updated, those numbers may change.

Screen Shots

Because VBECS is a medical device, screen shots must be captured at various points throughout the technical manual-security guide to meet FDA requirements for objective evidence and documentation. A

(camera) at the beginning of each step that requires a screen capture will identify these points. For more information, see Appendix A: Instructions for Capturing Screen Shots.

Enterprise Operations Tasks

Some of the tasks in this guide are executed by members of Enterprise Operations (EO) affiliated with the data center where VBECS Servers are hosted. These tasks are differentiated by the text in the headings with (Enterprise Operations Only) noted in the heading.

Appendices

The appendices contain reference materials.

While pressing the Ctrl button, left-click on a section name or page number in the table of contents to move to that section or page. The index does not incorporate this feature.

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Remote Desktop Configuration (Windows)

Configure the screen resolution, sound, and connection speed, and create a Remote Desktop Connection shortcut on each VBECS workstation.

Server Name and Screen Resolution

To set the screen resolution:

- 1) Double-click 😂 (the **Remote Desktop Connection** icon).
- 2) Click **Show Options** (Figure 3).

Figure 3: Example of Remote Desktop Connection Options

😽 Remote D	esktop Connection			X
	Remote Desktop Connection			
<u>C</u> omputer:	<server name="">.aac.dva.va.go</server>	v	•	
User name:	None specified			
The remote c computer nam	omputer name is not valid. Enter ne.	a valid remote		
Show O	ptions	Connect		elp

- 3) Click the **General** tab (Figure 4).
- 4) Enter the VBECS application server's fully qualified domain name (FQDN) in the **Computer** field. The name will always be your server name followed by **.aac.dva.va.gov**

Figure 4: Example of General Tab Computer and Domain

nemot	e Desktop Connection
N	Remote Desktop Connection
General	Display Local Resources Programs Experience Advanced
Logon s	settings
	Enter the name of the remote computer.
	<u>C</u> omputer: <server name="">.aac.dva.va.gov ▼</server>
	User name:
	The remote computer name is not valid. Enter a valid remote computer name.
Connec	tion settings
	Save the current connection settings to an RDP file or open a saved connection.
A Hide (Qptions

- 5) Click the **Display** tab (Figure 5).
- 6) Click, hold, and slide the pointer to a screen resolution of Full Screen.

Figure 5: Example of Display Tab

Nemot	e Desktop Connection
	Remote Desktop Connection
General	Display Local Resources Programs Experience Advanced
Display	configuration
	Choose the <u>size</u> of your remote desktop. Drag the slider all the way to the right to use the full screen.
	Small Large
	Full Screen
	Use all my monitors for the remote session
Colors	Choose the <u>c</u> olor depth of the remote session.
V Displa	ay the connection <u>b</u> ar when I use the full screen
(a) Optio	ns Connect <u>H</u> elp

Sound

To enable sound:

- 7) Click the Local Resources tab (Figure 6).
- 8) Click the **Settings** button.

 $rac{1}{2}$ Failure to properly configure the sound disables audible alerts throughout VBECS.

Figure 6: Example of Remote Computer Sound

🐁 Remote De	esktop Connection	
	Remote Desktop Connection	
General Dis	play Local Resources Programs Experience Advanced	
Remote aud	Configure remote audio settings.	
Keyboard	Apply Windows <u>k</u> ey combinations: Only when using the full screen	
Local devic	es and resources Choose the devices and resources that you want to use in your remote session.	
(a) Options	Co <u>n</u> nect <u>H</u> elp	

- 9) Select **Play on this computer** (Figure 7) from the Remote audio playback section.
- 10) Click the **OK** button.

Figure 7: Remote audio playback selection

Remote De	sktop Connection
-	Remote Desktop Connection
Remote a	audio playback
	Play on this computer
	O Do not play
	Play on remote computer
Remote a	audio recording
~	© <u>R</u> ecord from this computer
	O not record
	OK Cancel

Keyboard

To configure keyboard settings:

- 11) Click the Local Resources tab (Figure 8).
- 12) Select **On this computer** from the Keyboard drop-down list.

Figure 8: Example of Remote Computer Keyboard

Remote Desktop Connection		
	Remote Desktop Connection	
General Di	splay Local Resources Programs Experience Advanced	
Remote au	dio Configure remote audio settings. <u>S</u> ettings	
- Keyboard -	Apply Windows <u>k</u> ey combinations: On this computer Example: ALT+TAB	
Local devic	ces and resources Choose the devices and resources that you want to use in your remote session. Image: Printers Image: More	
<u>Options</u>	Connect <u>H</u> elp	

Connection Speed

To set the connection speed:

- 13) Click the **Experience** tab (Figure 9).
- 14) Select LAN (10 Mbps or higher) from the Choose your connection speed to optimize performance drop-down list. Deselect Font smoothing.

Figure 9: Example of Connection Speed

Remote Desktop Connection		
Remote Desktop Connection		
General Display Local Resources Programs Experience Advanced		
Performance		
Choose your connection speed to optimize performance.		
LAN (10 Mbps or higher)		
Allow the following:		
Desktop <u>b</u> ackground		
Eont smoothing		
☑ Desktop composition		
Show window contents while dragging		
Menu and window animation		
✓ Visual styles		
Persistent bitmap caching		
Reconnect if the connection is dropped		
Hide Options Connect Help		

Save Settings

To save the settings:

- 15) Click the **General** tab (Figure 10).
- 16) Click Save As.

Figure 10: Example of General Tab Save As

nemote	Desktop Connection
	Remote Desktop Connection
General [Display Local Resources Programs Experience Advanced
Logon set	ttings
	Enter the name of the remote computer.
	Computer: <pre><server name="">.aac.dva.va.gov</server></pre>
	User name:
	The remote computer name is not valid. Enter a valid remote computer name.
Connectio	on settings
	Save the current connection settings to an RDP file or open a saved connection.
	Save Save As Op <u>e</u> n
Hide Op	otions Connect Help

Create a Remote Desktop Connection Shortcut for VBECS

17) To create a Remote Desktop Connection shortcut for VBECS (Figure 11), save the file as VBECS.rdp in the C:\Users\Public\Public Desktop folder.



Figure 11: Example of Remote Desktop Connection Shortcut for VBECS

18) Double-click the shortcut to launch the Remote Desktop Connection to VBECS. The Windows start-up sound confirms that the sound functions.

Server Hardware and System Configuration

The VBECS application requires hardware and system software to service the requirements of a user population of five users in a standard configuration and up to twenty-five users in an integrated Veterans Integrated Service Network (VISN) environment.

VBECS is installed in a virtualized environment using vSphere® as the virtualization platform. This section focuses on the configuration of the virtual machines. Table 15 and Table 16 contain the virtual machine specifications for the Application and SQL Servers respectively. The System Schematic diagram (Figure 12) describes the major system components:

• Application Server (App Server): This is a Windows 2008 Server Enterprise Edition R2 (x64) server and is the execution environment for the VBECS application (both Test and Production). It also functions as a Remote Desktop Protocol (RDP) Server. Each VBECS instance (single or multidivisional) has a unique App Server.

The App Server also communicates with and exchanges information with VistA applications and other HL7 interfaces through messages formatted using Extensible Markup Language (XML) and Health Level 7 (HL7) over Transmission Control Protocol/Internet Protocol (TCP/IP) networking.

• SQL Server: This is a Windows 2008 Server Enterprise Edition R2 (x64) server that runs SQL Server 2012. It hosts the VBECS' databases for each single or multidivisional instance. Up to 15 sites share a single SQL Server.

SQL Servers exist in an AlwaysOn cluster, which consists of three nodes. The Primary and High Availability servers reside at the primary site while a Disaster Recovery server resides at an alternate location:

- Primary SQL Server: This server fields all requests. Its data are replicated to the High Availability and Disaster Recovery servers.
- High Availability (HA) SQL Server: This server provides database backup services through synchronous replication. Its data are guaranteed to be consistent with the Primary. It becomes the Primary should the original Primary server fail or become unreachable. Failover to this server is automatic.
- Disaster Recovery (DR) SQL Server: This server resides at a remote site and provides database backup services through asynchronous replication. It becomes the Primary server should both the Primary and HA server fail or become unreachable. Failover to this server is a manual process.
- Windows Workstations: Users continue to access the VBECS application using Remote Desktop Services.

Figure 12: System Schematic



Required Peripherals

Table 1 describes additional required hardware.

Table 1: Additional Required Hardware

Additional Required Hardware			
Hand-Held Model 4600 (This is the model distributed with the original VBECS deployment			
Barcode Scanner	and is now discontinued. The successor is the Honeywell Xenon 1900.)		
Report Printer	HP LaserJet 9040dn (sites may elect to use a different report printer)		
Label Printer	Zebra ZM400, Z4MPlus or ZT410; Must print at 300 DPI and have Ethernet connectivity.		

Printers

Report Printer

A laser printer capable of printing 8.5" x 11" sheets may be used. VBECS supports duplex printing, but not all printers are duplex capable. Consult the printer documentation to determine if it has this capability.

Installing a Printer (Server Administrators Only)

To install a printer, execute the following instructions:

- 1) Copy the printer driver to the C:\temp directory on the app server.
- 2) Log into the app server with administrative privileges.

3) Click **Start**, **Devices and Printers**. The Device and Printers window is displayed (Figure 13). Click the **Add a printer** button.

Figure 13: Example of Devices and Printers, Add a printer



4) In the Add Printer Wizard screen, select the Add a local printer button (Figure 14).

Figure 14: Example of Add Printer Wizard

ld Prir	nter			
🖶 Add Printer				
What type of printer do you want to install?				
•	Add a local printer Use this option only if you don't have a USB printer. (Windows automatically installs USB printers when you plug them in.)			
•	Add a network, wireless or Bluetooth printer Make sure that your computer is connected to the network, or that your Bluetooth or wireless printer is turned on.			
	Next Cancel			

5) On the Choose a printer port window, select **Create a new port** radio button. From the Type of port: drop-down, select **Standard TCP/IP Port**. Click **Next** (Figure 15).

Figure 15: Example of Add Printer Wizard

Add Printer			
nection that allows your computer to	exchange information with a printer.		
LPT1: (Printer Port)	<u></u>		
Standard TCP/IP Port			
	nection that allows your computer to LPT1: (Printer Port) Standard TCP/IP Port		

6) Enter the IP address of the printer in the **Hostname or IP address** field (the **Port Name** field will populate automatically). Click **Next** (Figure 16).

Figure 16: Example of TCP/IP Settings

aa 😂	ld Printer		×
\bigcirc	🖶 Add Printer		
	Type a printer hostname or IP	address	
	Device type:	TCP/IP Device	-
	Hostname or IP address:		
	Port name:		
	🔽 Query the printer and automa	atically select the driver to use	
			Next Cancel

7) Click Finish (Figure 17).

Figure 17: Example of Review Settings

Add Standard TCP/IP Printer	Port Wizard	
	Completing the Add Standard TCP/IP Printer Port Wizard You have selected a port with the following characteristics.	
	SNMP: Protocol: Device: 0 Port Name: Adapter Type:	Yes RAW, Port 9100 IP Hewlett Packard Jet Direct
	To complete th	nis wizard, click Finish.
		< <u>B</u> ack Finish Cancel

8) To select a driver, click Have Disk (Figure 18).

Figure 18: Example of Add Printer Wizard

Add Printer		
🔒 🖶 Add Printer		
Install the printer driver		
Choose your printer from	the list. Click Windows Update to see more models.	
To install the driver from	an installation CD, click Have Disk.	
Manufacturar	A Drintor	
Generic	HP I scerlet M5035 mfn PCI 6	
Gestetner	HP Laserlet M9040 MEP PCL6	
HP	HP Laserlet M9050 MEP PCL6	
infotec	HP Laserlet P2015 PCL6	
KONICA MINOLTA	HP Laserlet P2050 Series PCL6	-
	Mindaus Undets 1 University	1
I his driver is digitally signed.	Windows Opdate Have Disk	
Tell me why driver signing is i	mportant	
		1
		icei

9) Click **Browse** (Figure 19). Navigate to the driver that you copied to C:\temp\ in Step 1. Click **Open** (Figure 20).

Figure 19: Example of Install from Disk

Install Fro	Install From Disk 🛛 🔀		
~	Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.	OK Cancel	
	Copy manufacturer's files from:	Browse	

Figure 20: Example of Select Driver

I	Locate File					×
	Look in:	鷆 temp		💌 🗿 😰 I	• 🖽 👏	
	Recept Places	Name Itest_install HP9040 PCL6 D	river.inf	↓ Date modified 4/17/2013 6:31 F 5/9/2013 10:32 /	▼ Type PM File folder AM Application	
i						
	Libraries					
	Computer					- 1
:	Network					
		<u> </u>				
		File name:	HP9040 PCL6 Driver.inf		<u> </u>	Open
		Files of type:	Setup Information (*.inf)		- C	Cancel

- 10) Click **OK** (Figure 19).
- 11) For a single-division site, enter **VBECS Printer** as the printer name. For a multidivisional site, enter **VBECS Printer** and the site name (e.g., VBECS Printer Hines). Click **Next** (Figure 21)

Figure 21: Example of Add Printer Wizard

and Add Printer			
\bigcirc	🖶 Add Printer		
	Type a printer name		
	Printer name:	VBECS Printer	
	This printer will be inst	alled with the HP LaserJet M9040 MFP PCL6 driver.	
			Next Cancel

12) Click the **Do not share this printer** radio button. Click **Next** (Figure 22).

Figure 22: Example of Add Printer Wizard

a Ad	and Add Printer 🔀 🔀 🔀 😹 🔀 🔀			
0	🚍 Add Printer			
	Printer Sharing			
	If you want to share t type a new one. The	his printer, you must provide a share name. You can use the suggested name or share name will be visible to other network users.		
	 Do not share this 	printer		
	C Share this printer	so that others on your network can find and use it		
	Share name:	VBECS Printer2	-	
	Location:]	
	Comment:		1	
		Next Cance		

13) Click Next (Figure 23).

Figure 23: Example of Add Printer Wizard

Ad	d Printer
$\overline{)}$	Add Printer
	You've successfully added VBECS Printer
	Set as the default printer
	To check if your printer is working properly, or to see troubleshooting information for the printer, print a test page.
	Print a test page
	- Finith - Concel

Label Printer (Zebra ZM400, Z4Mplus and ZT410)

Do not install the label printer on the VBECS Server. Connectivity is configured in VBECS Administrator (See the VBECS Administrator User Guide).

VBECS is configured to work only with Zebra printers: VBECS uses Zebra Programming Language to communicate with the printer. Other requirements:

- Ethernet connectivity: the label printer must have an Ethernet card
- Must print on 4" x 4" label stock
- Must print at 300DPI

Prior to configuring the label printer, load the ribbon and label stock and ensure that the printer is on. If the printer does not display PRINTER READY, there is a problem that must be resolved before proceeding. Refer to the Zebra user guide or printer CD for more information.

Scanners

Scanners used with VBECS must be able to scan Codabar, ISBT 128, and PDF-417 barcodes. To configure a scanner. VBECS no longer supports entry of new Codabar units into the system.

- 1) Connect the scanner to the workstation.
 - a. To configure a **Hand-Held 4600** scanner, scan the barcode in Figure 24.

Figure 24: Configuration Barcode for a Hand-Held 4600



b. The configuration barcodes below only apply to the Honeywell Xenon 1900 series scanner. Do not try to configure any other scanners with these barcodes. To configure a Honeywell Xenon 1900 scanner, scan the Standard Product Defaults barcode in Figure 25 followed by the VBECS Default barcode in Figure 26.

Figure 25: Xenon 1900: Restore Defaults

Standard Product Defaults

The following bar code resets all standard product default settings.



Figure 26: Xenon 1900: VBECS Settings



To test the scanner, open Notepad. Print and scan the barcodes in Figure 27, Figure 28 and Figure 29. The Codabar and ISBT barcodes must scan as "~123456789"; the PDF 417 must scan as "~Testing."

Save and print the Notepad file for validation records.

Figure 27: Codabar



Figure 28: ISBT 128



Figure 29: PDF 417



Workstation Configuration

Specifications are as follows:

• Memory: 2GB

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- Display: 17"
- Video: video card with 16-bit color and 1024 x 768 resolution
- Operating System: Microsoft Windows 7 Enterprise
- Input Devices: U.S. 101-key keyboard, mouse
- Audio: Sound card and speakers
- Personal Identity Verification (PIV) card reader: required for PIV card access

Report Share

The VBECS system provides a share for users to access reports from their workstations (see Configure a Shortcut to the Report Share). While VBECS administrators have the ability to create and delete files and folders, users have read-only access to the share.

Implementation and Maintenance (Enterprise **Operations Only)**

The U.S. Food and Drug Administration classifies this software as a medical device. Unauthorized modifications will render this device an adulterated medical device under Section 501 of the Medical Device Amendments to the Federal Food, Drug, and Cosmetic Act. Acquiring and implementing this software through the Freedom of Information Act require the implementer to assume total responsibility for the software and become a registered manufacturer of a medical device, subject to FDA regulations.

Periodic System Maintenance

The VBECS SQL Maintenance jobs run nightly from 10:00 PM to 1:00 AM (CST). Do not reboot the server during this time interval. Doing so may cause consistency and allocation errors.

The system will fail to function as intended when maintenance checks are not performed or are not performed correctly (Table 2).

Action	Frequency	Description
System Center Operations Manager (SCOM) Alerts	Daily	SCOM emails alert messages to a Server Administrators mail group. Investigate all alerts to completion.
Review Database Integrity Reports	Daily	Take action only upon receipt of a job failure email. See the SQL Maintenance Jobs section for more details.
Apply Windows Updates	Wednesday, two weeks after 2nd Tuesday of the month	See Applying Windows Updates.
VBECS Reports folder cleanup	Annually or as needed	Users are able to export reports to the D:\VBECSReports folder on the App Server. The D drive is 10 GB in size and logs are also stored there.
		On an annual basis or whenever the folder is over 90% full, old reports must be deleted. This activity must be performed by a server administrator and should be coordinated with blood bank personnel.

Table 2: Periodic System Maintenance

SQL Maintenance Jobs

The VBECS databases are contained within Microsoft SQL Server and require regular maintenance jobs to backup, validate integrity, and improve performance. The jobs are automated and configured to run according to the specifications shown in Table 3, Table 4 and Table 5.

System Level Jobs: Each system level job executes against all databases found on the SQL system not contained in an Availability Group. Email alerts are sent to <u>VAOITVBECSSQLSupport@va.gov</u>.

Table 3: System Level Jobs

Databases Affected	Job Name	Start Time
All databases not in an Availability Group	System_IntegrityCheck	10:00pm
All databases not in an Availability Group (except TempDB)	System_FullBackups	11:00pm
n/a	System_ResetServerLog	Every Saturday at 12:00am

Availability Group Level Jobs: Each Availability Group level job executes against all VBECS databases found within the Availability Group indicated by the job name (Table 4). Email alerts are sent to the recipients defined in the targeted database's CPRS interface (see SQL Maintenance Job Alerts section).

Table 4: Availability Group Level Jobs

Databases Affected	Job Name	Start Time
All VBECS databases in the Availability Group AGVISNXX (XX is equal to the VISN number)	AGVISNXX_DifferentialBackups	Every 6 hours between 3:00am and 10:00pm
	AGVISNXX_TransactionalLogBackups	Every 2 hours between 2:00am and 11:00pm
	AGVISNXX_ReIndexTables	10:00pm
	AGVISNXX_UpdateStats	10:30pm
	AGVISNXX_IntegrityCheck	11:30pm
	AGVISNXX_FullBackups	12:15am

VBECS Level Jobs: Each VBECS level job targets a single VBECS database indicated in the job name (Table 5). These jobs affect user data by expiring Component and Test Orders and marking units Presumed Transfused. Email alerts are sent to the recipients defined in the targeted database's CPRS interface (see SQL Maintenance Job Alerts section).

Table 5: VBECS Level Jobs

Databases Affected	Job Name	Start Time
(Test SQL Server)	AGVISNXX_VBECS_SSS_TEST_Background_Jobs	
VBECS_SSS_TEST		
(SSS is equal to the Site		12:01om
Code)		12.01411
(Production SQL Server)	AGVISNXX_VBECS_SSS_PROD_Background_Jobs	
VBECS_SSS_PROD		

SQL Maintenance Job Alerts

Email alert messages are sent only when a SQL maintenance job fails. System Level job alerts are sent to <u>VAOITVBECSSQLSupport@va.gov</u> and <u>EOVBEDatabaseAdministration@va.gov</u>. Refer to the VistA Blood Establishment Computer Software (VBECS) Admin User Guide.

SQL maintenance job alerts are marked with High Importance and must be acted upon immediately. The email will contain details of the failure and instructions for contacting the Service Desk Primary Contact. When a SQL integrity job fails, a report will be included as an attachment with the alert – include this with any support ticket (Service Desk Primary Contact) or communication (Figure 30).

Figure 30: Example of a SQL Maintenance Job Failure Email

🛛 🔄 😕 👩 🐟 🗇 🗢 Immediate attention required - VBECS SQL job failure! - Message (Plain Text)		
File Message McAfee E-mail Scan		▽ (
This message was sent with High importance.		
rom: O No Replies Qva.gov>	Sent:	Fri 6/14/2013 8:59 AM
G		
ubject: Immediate attention required - VBECS SQL job failure!		
ttachments: VBECS_TS3_TEST_IntegrityReport_20130614.txt (28 KB)		
		C C
A VBECS SQL Job has failed and needs to be fixed immediately.		
ERROR DETAILS:		
Server:		
Time : Jun 14 2013 8:59AM		
Time : Jun 14 2013 8:59AM Database : Hand Lange - Hand Lange		
Time : Jun 14 2013 8:59AM Database : Contraction of the second se		
Time : Jun 14 2013 8:59AM Database : The second sec		

SQL Database Backups

To assist recovery and support options, database backup files and integrity reports are retained for 7 days for each SQL database and can be found on the SQL Server at **H:\Program Files\Microsoft SQL** Server\MSSQL11.MSSQLSERVER\MSSQL\Backup. If tape or offsite backups are desired, locate and backup the folders associated with the 3-character site code (*SSS*). For example, on a production SQL server, Hines ("HIN" site code) would backup the VBECS_HIN_PROD and VBECS_HIN_PROD_MIRROR folders.

Applying Windows Updates

App server updates require downtime, which is detailed in Table 6 and Table 7. SQL server updates require no downtime.

The VistA Blood Establishment Computer Software (VBECS) systems are updated with Microsoft Windows Security patches by Austin Information Technology Center (AITC) staff during defined maintenance periods (Table 6 and Table 7).

The monthly maintenance schedule begins the second Tuesday of the month that Microsoft defines as Patch Tuesday.

- 1) Enterprise Operations installs Windows Updates patches to VBECS maintenance team preproduction servers.
- 2) VBECS maintenance team tests the patched pre-production servers and proves that the updates do not affect VBECS.
- 3) After the VBECS maintenance team approves the updates, Enterprise Operations creates change orders for the customer-test system and another for the production system.
- 4) Enterprise Operations will submit an ANR and then install the patches, using the approved schedule, on the customer-test systems.
- 5) Enterprise Operations will submit an ANR and then install the patches, using the approved schedule, on the production systems.

Table 6: Customer Test System Patch Schedule

Server	Day
App Servers	15 days after patch Tuesday, 10 AM local time (automatic with
	notification)
Product Support Servers	10 days after patch Tuesday, 8-9 AM CST (manual)
Production Quorum Servers	11 days after patch Tuesday, 8-9 AM CST (manual)
SQL Server, Disaster Recovery node	10 days after patch Tuesday, 8-9 AM CST (manual)
SQL Server, High Availability node	10 days after patch Tuesday, 9-10 AM CST (manual)
SQL Server, Primary node	10 days after patch Tuesday, 10-11 AM CST (manual)

Table 7: Production System Patch Schedule

Server	Day
Application Servers	15 days after patch Tuesday, 10 AM local time (automatic with
	notification)
SQL Server, Disaster Recovery node	15 days after patch Tuesday, 9-10 AM CST (manual)
SQL Server, High Availability node	15 days after patch Tuesday, 10-11 AM CST (manual)
SQL Server, Primary node	15 days after patch Tuesday, 11-12 PM CST (manual)
The App Servers are updated differently than the SQL Servers:

- App Servers: The App Servers are updated and rebooted by an automated process at 10:00am local time on the day of patch release. VBECS users connected to the server receive a warning at the following time intervals: 15 minutes, 10, 5, 4, 3, 2 and 1 (Figure 31).
- If the App Server is not operational by 10:15AM local time, contact the Service Desk Primary Contact.

Figure 31: Example of Server Restart Warning

Message from 4/9/2015 2:03 PM	×
The VBECS system will automatically reboot in 15 minutes for scheduled updates. Please save your work and log off.	
OK	

• **SQL Servers**: Due to clustering, the SQL Servers require manual update. The manual process is described in the next section.

Applying Updates to VBECS SQL Server System

Each VBECS SQL Server system is comprised of three servers that are setup for redundancy with the use of Windows Failover Clustering and the Microsoft SQL AlwaysOn technology:

- Server 1: referred to as the Primary server
- Server 2: local secondary server, referred to as the High Availability (HA) server
- Server 3: remote secondary server, referred to as the Disaster Recovery (DR) server

Replica is another name for a server within a SQL Server AlwaysOn configuration.

The names of the VBECS SQL servers can be found on the Data Center Worksheet (Figure 32).

Figure 32: Example Data Center Worksheet

-	SQL S				
	Item	Resource	Name	Disk Sizes	
	#				
	1	Server 1	RnnXXXSQLVBPR01	980GB	
	2	Server 2	RnnXXXSQLVBHA01	980GB	
	3	Server 3 (DR site)	RnnXXXSQLVBDR01	980GB	
	4	Classic		DT/A	

Failure to adhere to these instructions could result in data loss and/or system failure. Always apply updates to Server 3 first and the Primary Replica last.

When updating a VBECS SQL Server system, refer to the flowchart in Figure 33 for the proper execution order.





Failover is a term used to describe the process of changing which server in a SQL AlwaysOn configuration is designated as the Primary Replica. Never use the following instructions to failover to Server 3 (DR Server). Instructions for forcing a failover to Server 3 are provided in the VBECS Disaster and Recovery guide.

PA Server Administrator should only initiate manual failover when client usage of the system is minimal. Users may briefly lose VBECS database connectivity depending on how long the failover takes.

Apply Updates to Server 3

- 1) Open a remote desktop connection to Server 3 of the VBECS SQL Server system.
- 2) Apply the Windows/Software Updates using the supplied instructions for the updates (reboot Server 3 only if instructed).

Identify the Primary and Secondary Replica

3) Open a remote desktop connection to Server 1 of the VBECS SQL Server system. On the Start menu, click All Programs, Microsoft SQL Server 2012, SQL Server Management Studio.

4) When prompted to connect to a server, enter the name of Server 1 in the Server Name field and click Connect (Figure 34). Note 1: VBECS Test system SQL Servers are named differently than production SQL servers. Note 2: If you have issues connecting, use the fully qualified domain name.

Connect to Server	ver "2012	X
Server type:	Database Engine	•
<u>S</u> erver name:	RnnXXXSQLVBPR01	•
Authentication:	Windows Authentication	•
<u>U</u> ser name:	-	• •
Password:		
	Remember password	
Connect	Cancel Help	Options >>

Figure 34: Example of the Connect to SQL Server Window

5) On the left side of the SQL Server Management Studio (SSMS) screen is the Object Explorer pane. Within the Object Explorer pane, right-click on the AlwaysOn High Availability folder and select Show Dashboard (Figure 35).

Figure 35: Example of Launching the SQL Dashboard

Object Explorer	
Connect 👻 🛃	🛃 = 🝸 🛃 🍒
🖃 🐻 . (SQL S	Server 11.0.3128 - VHAMASTER\VHAISHL
🛛 🛨 🚞 Dat	abases
🕘 🗄 😑 Sec	urity
🛨 🚞 Rep	lication
🛨 🧰 Alw	aysOn High Availability
🛛 🗉 📜 🚽	New Availability Group Wizard
🛛 🗉 🚞 🔔	
+ 💦	Show Dashboard
	Reports +

- - : your SSMS is not connected to the AG's Primary Instance server
 - 😢: there is a severe issue with the AG

Figure 36: Example of the SQL Server Dashboard

🔆 Dashboard: Microsoft SQL Server Management Studio (Administrator)							
<u>File E</u> dit <u>V</u> iew <u>T</u> ools <u>W</u> indow <u>H</u> elp							
🗄 🚰 🕶 🐨 🎽 📓 🔔 <u>N</u> ew Qu	i 🛐 🕶 📨 🧀 💭 🎒 🛄 New Query 📑 📸 📸 🦓 🐇 ங 🛍 🖃 – 🔍 – 💭 – 🖳 🦗 🗼						
Object Explorer							
Connect 🕶 🛃 🛃 🔳 🍸 🛃	2						
🖃 🐻 . (SQL Server 11.0.3128 - VHAM	Availability groups on	R05ISHSQLVBPR01					
🛨 🚞 Databases							
🕀 🧰 Security	Availability group:						
🕀 🧰 Server Objects	Availability Group Name	Primary Instance	Failover Mode				
\pm 🚞 Replication			the second s				
🕀 📄 AlwaysOn High Availability	AGVISNI	· · · · · · · · · · · · · · · · · · ·	Automatic				
🕀 🧰 Management	AGVISN2	· · · · · · · · · · · · · · · · · · ·	Automatic				
Integration Services Catalor	9						

 \mathbb{T} If any Availability Group status indicators are \mathbb{S} or if there are a mix of \mathbb{S} and \mathbb{O} indicators, VBECS is down and the problem must be resolved immediately.

- 7) If all of the indicators are , close SSMS. Restart at Step 3 connecting to the server listed in the Primary Instance column.
- 8) Make a note of the Primary and Secondary Replicas (i.e., if Server 1 is the Primary Replica, then Server 2 is the Secondary Replica and visa-versa).

Create Backups

- 9) Now that all of the AGs are running under the Primary Replica, navigate to and expand the SQL Server Agent, Jobs folder in the Object Explorer pane.
- 10) Double-click on Job Activity Monitor.

11) In the Job Activity window, click the **Filter** ... button (Figure 37).

Figure 37: Example of Job Activity Monitor

📆 Job Activity Monitor							_ 🗆 ×	I
Connection	¢ R	efresh 🍸 Filter 📑 Help						
Server:								1
	Age	ent Job Activity:						
Connection:		Name 🔺	Enabled	Status	Last Run Outcome	Last Run	Next Run 🔺	I
VHAMASTER	-6	AGPROD_DifferentialBackups	yes	Idle	Succeeded	8/2/2013 9:00:00 AM	8/2/2013	I
View connection properties	HC I	AGPROD_FullBackups	yes	Idle	Succeeded	8/2/2013 12:27:10 PM	8/3/2013	I
	H.	AGPROD_IntegrityCheck	yes	Idle	Succeeded	8/1/2013 11:30:00 PM	8/2/2013	I
Progress	-6	AGPROD_ReIndexTables	yes	Idle	Succeeded	8/1/2013 10:00:00 PM	8/2/2013	I
Done	æ	AGPROD_TransactionLogBackups	yes	Idle	Succeeded	8/2/2013 12:00:00 PM	8/2/2013	I
	B	AGPROD UpdateStats	ves	Idle	Succeeded	8/1/2013 10:30:00 PM	8/2/2013	I
	∣┖┚						F	l
							a 1	
								1

12) In the Filter Settings window, enter **full** in the **Name** field, check the **Apply filter** box and click **OK** (Figure 38).

Figure 38: Filter Settings

🝸 Filter Settings		×				
<mark>€≣ A</mark> ↓ 🖾						
All Jobs						
Category						
Enabled	All					
Last Run						
Last Pun Outcome	All					
Name	full					
Next Run						
Runnable	All					
Name Enter a comma-separated list containing the names of jobs to monitor, or leave blank if you do not intend to filter usin						
Apply <u>fi</u> lter	J	<u>C</u> lear				
OK	Cancel	Help				

13) Right-click the first job in the filtered list and select Start Job at Step... (Figure 39).

Figure 39: Example Starting a SQL Job

🔠 Job Activity Monitor - 🛲	anager of nor						l X
Y View filter settings	🙋 Refresh 🏾 👕 Filter 📗 Help						
Connection	Agent Job Activity:						
Server:	Name A	Enabled	Status	Last Run	Outcome	Last Run	Ne
Connections	AGPROD_FullBackups	Charle Jack	at Char	ceed	ed	8/13/2013 12:15:00 AM	8,
VHAMASTER	AGTEST_FullBackups	Start Job	at Step	ceed	ed	8/13/2013 12:15:00 AM	8,
View connection properties	System_FullBackups	2000 200		ceed	ed	8/12/2013 11:00:00 PM	8,
		Enable Jo Disable J	ob ob				
Progress		Refresh	job				
Done Done		Delete jo	ь				
$\mathbf{\overline{v}}$	•	View hist	ory				F
		Propertie	s				
	-					Close	

14) Wait for the job to finish (Figure 40). Verify the status indicator is Success before clicking Close.

Figure 40: Example Job Completion Message

Start Jobs			
Success	2 2	Total Success	0 Error 0 Warning
<u>D</u> etails:			
Action		Status	Message
Start Job 'Sy	stem_FullBackups'	Success	
Execute job	'System_FullBackups'	Success	
			Close

15) Repeat Steps 13 and 14 for each job in the list.

If any of the jobs fail to complete successfully, please notify the appropriate support personnel immediately by contacting the Service Desk Primary Contact.

16) Click Close on the Job Activity Monitor window.

Change the Failover Mode from Automatic to Manual

- 17) In the Object Explorer pane, navigate to and expand the AlwaysOn High Availability, Availability Groups folder.
- 18) Right-click on the first AG and select **Properties**; the Availability Group Properties window opens.
- 19) Locate the two servers with an Availability Mode of **Synchronous commit** (Figure 41). Change both **Failover Mode** cells from Automatic to **Manual** and click **OK**. If the fields are greyed-out, you are not connected to the Primary Replica: close SSMS, logoff the server and restart at Step 3.

Figure 41: Example of the Availability Group Properties

🞁 Availability Group Propertie	es - AGTEST1							-	. 🗆 🗙
Select a page	🔄 Script 👻 📑 Help)							
General Backup Preferences Permission	Availability group <u>n</u> a	Availability group <u>n</u> ame: AGTEST1							
	Availability Data <u>b</u> ase	es ———							
	Database Name								
	VBECS_CAT_TES	т							
	VBECS_CAT_TES	T_MIRROR							
	1						<u>A</u> dd	<u>R</u> emo	ve
Connection	Availability Replicas	·							
Server:	Server Instance	Role	Availability Mode		Failover Mode	C	onnections lole	in Primary	Ri
	THE LOUIS AND	Primary	Synchronous commit	-	Automatic	- A	low all conr	nections	✓ Nc
VHAMASTER		Secondary	Synchronous commit	-	Automatic	- 1	low all conr	nections	✓ Nc
View connection properties		Secondary	Asynchronous commit	•	Manual	- A	low all conr	nections	✓ Nc
Progress Ready	<u>.</u>						Add	Remo	ve
							ОК	Cance	<u>الا</u>

- 20) Repeat Steps 18 and 19 for each AG on the server until each has their **Failover Mode** set to **Manual**.
- 21) Close SSMS.

To prevent an unintentional automatic failover during the upgrade process, the Failover Mode must be set to Manual on each replica before performing a Manual Failover of the Availability Groups.

Apply Updates to the Secondary Replica

- 22) Open a remote desktop connection to the Secondary Replica identified in Step 8 of the VBECS SQL Server system.
- 23) Apply the Windows/Software Updates using the supplied instructions for the updates (reboot the server only if instructed).

Failover the Availability Groups to the Secondary Replica

- 24) Open SSMS and connect to the Secondary Replica noted in Step 8.
- 25) Inside the Object Explorer pane, navigate to and expand the AlwaysOn High Availability, Availability Groups folder.
- 26) Right-click on the first AG and select Failover...; an Availability Group Failover wizard starts.
- 27) Click Next (Figure 42).

Figure 42: Example of the Availability Group Failover Wizard

👘 Fail Over Availability	Group: AGTEST1
Introduct	ion
Introduction	Fail over this availability group to this secondary replica.
Select New Primary Replic	Failover will make this secondary replica the new primary replica for this availability group.
Results	To failover to this replica, you will need to: • Confirm this replica as the new primary replica. • Review your selections. • Check the results of the failover process.
	To begin the failover process, click Next.
	Do not show this page again.
	< Previous Cancel

28) Verify the Failover Mode is Manual and Failover Readiness is No data loss. Click Next (Figure 43). Note: If two servers appear in the list, then you are connected to the Primary Replica. Click Cancel and close SSMS. Restart at Step 24.

Figure 43: Example of Selecting the New Primary Replica

📸 Fail Over Availability Group:				_ 🗆 🗵
Select New Prin	nary Replica			
Introduction	Select the new primary r	eplica for this availabilit	y group.	🕜 Help
Select New Primary Replica	Current Primary Replica:			
Summary	Primary Replica Status: Quorum Status:	Synchronous commit and U Normal Quorum	Inknown	
Results	Choose new primary replica:			
	Server Instance	Availability Mode	Failover Mode	Failover Readiness
		Synchronous commit	Manual	<u>No data loss</u>
				<u>R</u> efresh
		<	Previous <u>N</u> ext	> Cancel

If the Failover Readiness field is not in a state of No data loss, notify SQL Server support personnel immediately by contacting the Service Desk Primary Contact.

29) A Summary window is displayed (Figure 44). If any of the field values are incorrect (Failover Actions must be No data loss), click **Cancel** and close SSMS. Restart at Step 24.

Figure 44: Example of Availability Group Failover Wizard Summary

💼 Fail Over Availability Group: A	GTEST1	
Summary		
Introduction	Verify the choices made in this wizard.	🕜 Help
Select New Primary Replica	Click Finish to perform the following actions:	
Summary Results	Current Primary Replica The second	
		Script 💌
	< <u>P</u> revious <u>Fini</u>	sh Cancel

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- 30) Click Finish to initiate the failover.
- 31) A failover may take several minutes to complete. Click Close (Figure 45).

Figure 45: Example of Successful Failover Wizard

🞁 Fail Over Availability Group: A	STEST1	
Results		
Introduction	The wizard completed successfully.	🕜 Help
Select New Primary Replica	Summary:	
Summary	Name	Result
Results	Validating failover settings for secondary replica	Success
	Performing manual failover to secondary replica	Success
	Completing the role change for secondary replica	Success
	Validating WSFC quorum vote configuration.	Success
	< <u>P</u> revious <u>N</u> ext >	<u>C</u> lose

If any of the Results indicate Error, Warning or Failure, contact SQL Server support personnel by contacting the Service Desk Primary Contact. Databases contained in the problem Availability Group will not be available for use until the problem is resolved.

- 32) Repeat Steps 26 through 31 for each AG on the server.
- 33) Close SSMS.

Apply Updates to the Remaining Server (Original Primary Replica)

- 34) Open a remote desktop connection to the Original Primary Replica (identified in Step 8) of the VBECS SQL Server system.
- 35) Apply the Windows/Software Updates using the supplied instructions for the updates (reboot the server only if instructed).

Failover the Availability Groups Back to the Original Primary Replica

- 36) Open SSMS and connect to the Primary Replica noted in Step 8.
- 37) Inside the Object Explorer pane, navigate to and expand the AlwaysOn High Availability, Availability Groups folder.
- 38) Right-click on the first AG and select **Failover...**; an Availability Group Failover wizard starts. Click **Next** (Figure 42).
- 39) Verify the Failover Mode is Manual and Failover Readiness is No data loss. Click Next (Figure 43). If two servers appear in the list, then you are connected to the Secondary Replica. Click Cancel and close SSMS. Restart at Step 36.

If the Failover Readiness field is anything other than **No data loss**, contact SQL Server support personnel (contact the Service Desk Primary Contact).

- 40) A Summary window is displayed (Figure 44). If any of the field values are incorrect (Failover Actions must be No data loss), click **Cancel** and close SSMS. Restart at Step 36.
- 41) Click **Finish** to initiate the failover.
- 42) The failover may take several minutes to complete. Click Close (Figure 45).

If any of the Results indicate Error, Warning or Failure. Databases contained in the problem, contact SQL Server support personnel (contact the Service Desk Primary Contact). Availability Group will not be available for use until the problem is resolved.

43) Repeat Steps 28 through 42 for each AG on the server.

Change the Failover Mode from Manual to Automatic

- 44) Right-click on the first AG and select **Properties**; the Availability Group Properties window open.
- 45) Locate the two servers with an Availability Mode of **Synchronous commit** (Figure 46). Change both **Failover Mode** cells from **Manual** to **Automatic** and click **OK**.

Figure 46: Example of the Availability Group Properties

🞁 Availability Group Propertie	s - AGTEST1									
Select a page	🛒 Script 👻 📑 Help									
General Backup Preferences Permission	Availability group <u>n</u> ar	me: AGTES	GT1							
	Availability Data <u>b</u> ase	Availability Databases								
	Database Name									
	VBECS_CAT_TEST	Г								
	VBECS_CAT_TEST	_MIRROR								
	,						Add	<u>R</u> emove		
Connection	Availability Re <u>p</u> licas									
Server:	Server Instance	Role	Availability Mode		Failover Mode		Connections in F Role	rimary	R/ Se	
· ·		Primary	Synchronous commit	-	Manual	•	Allow all connect	ions 💌	Nc	
VHAMASTER		Secondary	Synchronous commit	•	Manual	-	Allow all connect	ions 💌	Nc	
View connection properties		Secondary	Asynchronous commit	•	Manual	•	Allow all connect	ions 💌	Nc	
Progress Ready	4						Add	Remove	•	
							ОК	Cancel		

- 46) Repeat Steps 44 and 45 for each AG on the server until each has their **Failover Mode** set to **Automatic**.
- 47) Close SSMS and log off the server.

ePolicy and Virus Definitions

Virus definitions are automatically updated on the VBECS system. The VBECS maintenance team monitors the releases.

Do not change the system! The U.S. Food and Drug Administration classifies this software as a medical device. Unauthorized modifications will render this device an adulterated medical device under Section 501 of the Medical Device Amendments to the Federal Food, Drug, and Cosmetic Act. Acquiring and implementing this software through the Freedom of Information Act require the implementer to assume total responsibility for the software and become a registered manufacturer of a medical device, subject to FDA regulations. Adding to or updating VBECS software without permission is prohibited.

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VistA Maintenance Operations

Four HL7 Logical Links and one VistALink connection must be established and configured to establish proper communication with VBECS. The HL7 links are OERR-VBECS, VBECS-OERR, VBECSPTU, and VBECSPTM. The VistALink connection configuration is the data that VistA will use to transmit data in XML format to VBECS. The following set of instructions will aid in the proper configuration of these links, and ensure reliable communication between VistA and VBECS. These links must be configured during the initial installation of VBECS, and after any changes to the HL7 or VistALink configuration on VBECS. The settings should also be updated after the VistA Test account has been remirrored.

Set Up VBECS Outbound Logical Links

- 1) At the "Select HL7 Main Menu Option:" prompt, enter Filer.
- 2) Shut down the logical link.
- 3) At the "Select Filer and Link Management Options Option:" prompt, enter Link Edit.
- 4) At the "Select HL LOGICAL LINK NODE:" prompt, enter OERR-VBECS (Figure 47).

Figure 47: HL7 Logical Link Edit Menu Navigation

```
HL7 Main Menu
  Event monitoring menu ...
   Systems Link Monitor
   Filer and Link Management Options ...
  Message Management Options ...
   Interface Developer Options ...
   Site Parameter Edit
Select HL7 Main Menu Option: FILER
   SM
          Systems Link Monitor
         Monitor, Start, Stop Filers
   FΜ
         TCP Link Manager Start/Stop
   LM
         Stop All Messaging Background Processes
   SA
         Restart/Start All Links and Filers
   RA
   DF
         Default Filers Startup
   SL
         Start/Stop Links
         Ping (TCP Only)
   ΡI
   ED
         Link Edit
   ER
         Link Errors ...
Select Filer and Link Management Options Option: ED
Select HL LOGICAL LINK NODE: OERR-VBECS
```

- 5) Enter **Enabled** in the AUTOSTART field (Figure 48).
- 6) Move the cursor to the LLP TYPE field and press Enter (Figure 48).

Figure 48: HL7 Logical Link

HL7	LOGICAL	LINK
NODE: OERR-VBECS INSTITUTION: DOMAIN: AUTOSTART: ENABLED QUEUE SIZE: 10 LLP TYPE: TCP		
 COMMAND: Insert		Press <pf1>H for help</pf1>
7) Change the value of the "TCP/I	P ADDRES	SS" and "TCP/IP PORT" parameters to the Internet

- 7) Change the value of the "TCP/IP ADDRESS" and "TCP/IP PORT" parameters to the Internet Protocol (IP) address and port number of the Blood Bank medical device application server at your site. Standard port numbers of 21993 for Test and 21994 for Prod are typically used.
- 8) Move the cursor to the "COMMAND:" prompt.
- 9) Enter **Close** to return to the previous screen.
- 10) At the "COMMAND:" prompt, enter Save.
- 11) Enter Exit.

Figure 49: TCP Lower Level Parameters: OERR-VBECS

HL7 LOGICAL LINK

TCP LOWER	LEVEL PARAMETERS				
OF	ERR-VBECS				
TCP/IP SERVICE TYPE: CLIENT (SENDER)					
TCP/IP ADDRESS: <ip address="" of="" td="" vbecs<=""><td>S application server></td></ip>	S application server>				
TCP/IP PORT: < Port number of VBECS a	TCP/IP PORT: < Port number of VBECS application server>				
ACK TIMEOUT: 30	RE-TRANSMISION ATTEMPTS:				
READ TIMEOUT: 30	EXCEED RE-TRANSMIT ACTION: restart				
BLOCK SIZE:	SAY HELO:				
STARTUP NODE:	PERSISTENT: NO				
RETENTION: 15	UNI-DIRECTIONAL WAIT:				
COMMAND:	Press <pf1>H for help</pf1>				

Insert

12) Repeat Steps 3 through 11 substituting "VBECSPTM" and "VBECSPTU" for "OERR-VBECS" when prompted for the logical link name to change the IP address and port numbers for the VBECSPTM and VBECSPTU logical links.

Set Up the VBECS Inbound Logical Link

- 1) At the "Select HL7 Main Menu Option:" prompt, enter Filer.
- 2) At the "Select Filer and Link Management Options Option:" prompt, enter Link Edit.
- 3) At the "Select HL LOGICAL LINK NODE:" prompt, enter **VBECS-OERR** (as shown for OERR-VBECS in Figure 47).
- 4) Enter **Enabled** in the AUTOSTART field (Figure 50).
- 5) Move the cursor to the LLP TYPE field and press Enter (Figure 50).

Figure 50: HL7 Logical Link



- 6) No "TCP/IP ADDRESS" should be entered. Change the value of the "TCP/IP PORT" parameter to the port number of the VistA HL7 Listener at your site. Regional support should be contacted for the correct port numbers. Standard port numbers of 21993 for Test and 21994 for Prod can be used if unique ports have not been assigned.
- 7) Move the cursor to the "COMMAND:" prompt.
- 8) Enter **Close** to return to the previous screen.
- 9) At the "COMMAND:" prompt, enter Save.

10) Enter Exit.

Figure 51: TCP Lower Level Parameters: VBECS-OERR

```
HL7 LOGICAL LINK
                        _____
                        TCP LOWER LEVEL PARAMETERS
                                VBECS-OERR
   TCP/IP SERVICE TYPE: SINGLE LISTENER
        TCP/IP ADDRESS:
           TCP/IP PORT: <VistA HL7 Listener Port>
    ACK TIMEOUT: 30
                                       RE-TRANSMISION ATTEMPTS:
   READ TIMEOUT: 30
                                     EXCEED RE-TRANSMIT ACTION:
     BLOCK SIZE:
                                                    SAY HELO:
 STARTUP NODE:
                                                  PERSISTENT: NO
                                        UNI-DIRECTIONAL WAIT:
    RETENTION:
COMMAND:
                                            Press <PF1>H for help
Insert
```

Start VistA HL7 Logical Links

- 1) Before data can be transmitted over the VBECS logical links, edit the link definitions as described above.
- 2) To turn on the new VBECS logical links, select START/STOP LINKS [HL START].
- 3) Start the "OERR-VBECS" logical link.
- 4) Start the "VBECS-OERR" logical link.
- 5) Start the "VBECSPTM" logical link.
- 6) Start the "VBECSPTU" logical link.
- 7) Ensure that the VistA HL7 Link Manager is running; VBECS messaging cannot occur without it.
- 8) To check the status of the Link Manager (and, if necessary, restart it), access the HL START/STOP LINK MANAGER menu option.

Monitor VBECS HL7 Logical Links

Once two-way communication has been established, you can monitor the links.

- 1) Use the "System Link Monitor" to view the status of the VBECS Logical Links.
- 2) From the "HL7 Main Menu", select **System Link Monitor** (Figure 52).

Figure 52: HL7 System Link Monitor Menu Navigation

```
HL7 Main Menu
Event monitoring menu ...
Systems Link Monitor
Filer and Link Management Options ...
Message Management Options ...
Interface Developer Options ...
Site Parameter Edit
```

Select HL7 Main Menu Option: System Link Monitor

- 3) When a list of VistA HL7 links defined at your site appears, press V at the "Select a Command:" prompt (Figure 53).
- 4) At the "Select LINK MONITOR VIEWS:" prompt, enter **VBECS** (Figure 53).

Figure 53: System Link Monitor

		SYSTEM	LINK MONIT	OR for <yo< th=""><th>ur site na</th><th>me></th><th></th></yo<>	ur site na	me>	
		MESSAGES	MESSAGES	MESSAGES	MESSAGES	DEVICE	
	NODE	RECEIVED	PROCESSED	TO SEND	SENT	TYPE	STATE
	LA7V 657			4	4	MM	Halting
	LL15VISN	105	105	394	105	NC	Shutdown
	MPIVA	0	0	322	0	NC	Shutdown
	NPTF	0	0	25	0	MM	Halting
	OERR-VBE	34	34	1019	1018	NC	Idle
	PSOTPBAA	28	28	52	28	NC	Shutdown
	VABAC	0	0	1	0	NC	Shutdown
	VAFAV	0	0	2	0	NC	Shutdown
	VAFHM	0	0	3	0	NC	Shutdown
	VAFRE	0	0	4	0	NC	Shutdown
	Incoming f	ilers runn	ing => 1	Т	askMan run	ning	
	Outgoing f	ilers runn	ing => 1	L	ink Manage	er running	
			2	М	onitor OVE	RDUE	
	Select a C	ommand:					
(N)	EXT (B) ACK	UP (A)LL	LINKS (S)C	REENED (V)IEWS (Q)	UIT (?)	HELP: V
Sele	ct LINK MON	ITOR VIEWS	: VBECS				

5) A screen similar to Figure 54 appears.

Figure 54: System Link Monitor

	SYSTEM L	INK MONITOR	for <your< th=""><th>site name:</th><th>></th><th></th></your<>	site name:	>	
	MESSAGES	MESSAGES	MESSAGES	MESSAGES	DEVICE	
NODE	RECEIVED	PROCESSED	TO SEND	SENT	TYPE	STATE
OERR-VBECS	0	0	0	0	NC	Idle
VBECS-OERR	0	0	0	0	SS	Idle
VBECSPTM	0	0	0	0	NC	Enabled
VBECSPTU	0	0	0	0	NC	Enabled
Incoming f:	ilers runn:	ing => 1	Т	askMan run	ning	
Outgoing f	ilers runn:	ing => 1	L M	ink Manage: onitor OVE	r Running RDUE	
Select a Co	ommand:					
N) EXT (B) ACKU	JP (A)LL I	LINKS (S)C	REENED (V)IEWS (Q)	UIT (?) H	HELP:

6) To exit the "System Link Monitor", at the "Select a Command:" prompt, enter q to quit.

The volume of HL7 traffic over these links depends on the number of daily CPRS Blood Bank orders and updates to the VistA clinical information at your site. These can be significant at large sites. Monitor the links closely the first few days after the installation and purge the HL7 log data (as appropriate) in accordance with your standard HL7 monitoring and purging procedures.

Configure VBECS VistALink Links

- 1) Use the "Edit Parameter Values" option on the "GENERAL PARAMETER TOOLS" menu to edit the values for the VistALink connection to VBECS.
- 2) At the "Select Instance:" prompt, enter LISTENER IP ADDRESS.
- 3) At the "Value:" prompt, enter the VBECS application server IP address.
- 4) At the "Select Instance:" prompt, enter LISTENER PORT NUMBER.
- 5) At the "Value:" prompt, enter **the** VBECS VistALink listener port number. This is typically 21991 for Test and 21992 for Prod.

6) Press Enter to exit the option.

Figure 55: VistALink Configuration

```
Select OPTION NAME: GENERAL PARAMETER TOOLS XPAR MENU TOOLS
                                                                General
Parameter Tools
  LV
         List Values for a Selected Parameter
         List Values for a Selected Entity
  LE
  LP
        List Values for a Selected Package
  LT
        List Values for a Selected Template
  ΕP
        Edit Parameter Values
  ΕT
         Edit Parameter Values with Template
  ΕK
        Edit Parameter Definition Keyword
Select General Parameter Tools Option: EP Edit Parameter Values
                        --- Edit Parameter Values
Select PARAMETER DEFINITION NAME: VBECS VISTALINK
----- Setting VBECS VISTALINK for Package: VBECS
Select Instance: LISTENER IP ADDRESS
Instance: LISTENER IP ADDRESS//
                                  LISTENER IP ADDRESS
Value: <IP address>//  ← Enter the VBECS application server IP address here.
Select Instance: LISTENER PORT NUMBER
Instance: LISTENER PORT NUMBER Replace
                                          LISTENER PORT NUMBER
               ←Enter the VBECS VistALink listener port here.
Value: 8000//
Select Instance:
```

VBECS Maintenance Operations

Refer to the VistA Blood Establishment Computer Software (VBECS) Admin User Guide.

Record Workload Data

VBECS workload data is recorded in VBECS when records that qualify as Workload Events are saved in VBECS. This data is transmitted to the VistA Laboratory workload recording system for national and local workload reporting.

Assumptions

- Workload codes were assigned to VBECS processes using Workload Codes.
- Healthcare Common Procedure Coding System (HCPCS) codes were assigned to blood products using Blood Products.
- A record was saved or inactivated immediately preceding workload data collection.
- The connection to VistA is active.

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Outcome

• Information was transmitted to VistA for inclusion in appropriate reports.

Limitations and Restrictions

None

Additional Information

- Workload Event data must include information required for Decision Support System (DSS), Patient Care Encounter (PCE), and Billing Awareness. Once in VistA, existing VistA functionality will handle required reporting.
- Billing Awareness is being developed concurrently and related requirements are anticipated based on initial contact with the Billing Awareness team.
- The system accumulates and periodically transmits workload information to the VistA Lab workload recording process. The data is transmitted from VBECS to VistA by the VBECS Workload Capture Remote Procedure called by a nightly Lab background process.
- Workload multipliers for all blood bank activities in VistA File #64 must be set to one (1) to avoid excessive Laboratory Management Index Program (LMIP) counts. This allows the workload multiplier set in VBECS to be correctly reflected on VistA reports.

User Roles with Access to This Option

All users

Transmit Workload Data

These steps are associated with the "Save" function within any class that performs a Workload Event such as recording a blood test result or interpretation for a unit or a patient, modifying a unit, and pooling units. VBECS must know which classes perform Workload Events and how to classify the work accomplished for reporting. When the database is updated, the VistA technologist ID of the updater, the division, and the date and time of the update are recorded. In some instances, a mechanism to capture LMIP workload information exists. In addition, for certain events that involve patient processing, the patient location, treating specialty, service, etc., are captured to satisfy PCE or DSS reporting requirements. These steps address the initial recording of these events.

User Action	VBECS
 Click Save to save a record from an option. 	Creates a Workload Event for every process record saved. Recognizes the activity as a new Workload Event. Checks for required reporting properties based on the type of record being saved. Determines the proper workload codes and other related information to be included.
0.5.	NOTES One or more workload codes can be collected with each Workload Event saved. A workload code may be multiplied for certain Workload Events.
2. Exit.	

Inactivate a Workload Event

VBECS updates VistA to inactivate the associated workload information (for a patient or a unit) so that PCE and Billing Awareness can be updated to reflect that the transaction is not valid.

User Action	VBECS
1. Inactivate a saved record.	Recognizes the activity performed as an inactivation of an existing Workload Event record. NOTES
2. Complete the update and choose to save.	Prompts to confirm the save. Saves workload data. NOTES When a previously saved workload-generating event is invalidated (such as in Remove Final Status, Invalidate Test Results, or invalidating previously logged-in units through Edit Unit Information or Invalidate Shipment), VBECS must create and transmit the same Workload Event information to VistA as a negative number
 Confirm the save. The entire onde when the record 	Saves workload data. NOTES When a saved Workload Event is associated with a patient, VBECS needs to link the Workload Event to the patient for future reports.
is saved.	

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External Interfaces

VistALink Remote Procedure Calls

Remote Procedure Calls (RPCs) provide a method of data exchange through VistALink for VBECS. The VBECS software provides data to or receives data from the VBECS Application Interfacing Support Software (VAISS) located in the VistA M environment through RPCs. This data exchange is controlled through Database Integration Agreements (DBIAs) between the blood bank medical device software and the VAISS VistA M software.

The VAISS software provides a set of M Application Programmer Interfaces (APIs) that call VBECS RPCs through the VBECS VistALink Listener Windows Service and return blood bank data to other VistA applications. The VAISS software also provides a set of VistA RPCs under the VBECS namespace in the Remote Procedure File (#8994) that are called by the VistA VistALink Listener client-server software. These calls are not public utilities and may be subject to change.

RPC Name	Database Integration Agreement (DBIA)	This RPC:
		Supports order entry of blood bank requests from the blood
VBECS Order Entry	4619	bank order entry dialog in CPRS
VBECS Patient Available Units	4620	Provides a list of assigned, crossmatched, autologous and directed blood units that are available for a patient
VBECS Patient Transfusion		
History	4621	Provides a list of past transfusions performed for a patient
		Provides a list of orderable blood products, or component
VBECS Blood Products	4622	classes, to the VistA Surgery package
VBECS Patient Report	4623	Provides patient specimen testing results, component requests, and available blood units for a patient to be displayed in CPRS
		Provides the most current ABO Group and Rh Type identified
VBECS Patient ABO_RH	4624	for a patient
VBECS Patient ABID	4625	Provides a list of antibodies identified for a patient
VBECS Patient TRRX	4626	Provides a list of transfusion reactions for a patient
VBECS Workload Capture	4627	Provides blood bank workload data to the VistA Laboratory Service package for workload reporting to national and local entities
VBECS Workload Update Event	4628	Updates completed workload-related data into the VBECS database after the VistA Laboratory Services package has completed workload-reporting transactions. Upon completion of the update, the RPC returns an XML response to the VAISS that initiated the communication indicating a successful or unsuccessful transaction.
VBECS Accession Area Lookup	4607	Provides a list of all Laboratory Blood Bank Accession Areas in VistA and their associated divisions to VBECS for workload reporting purposes
VBECS Blood Bank User Lookup	4608	Returns a list of all blood bank users identified in the VistA system to VBECS. Blood bank users are identified by the Security Keys of either LRBLOODBANK or LRBLSUPER.
VBECS Division Lookup	4609	Returns a list of all VAMC divisions associated with a VistA system
VBECS HCPCS Codes	4610	Returns a list of blood bank related HCPCS codes to be

Table 8: Remote Procedure Calls

RPC Name	Database Integration Agreement (DBIA)	This RPC:
Lookup		associated with processes, or procedures, performed in VBECS
VBECS Laboratory Test Lookup	4611	Returns a list of VistA Laboratory tests to be associated with blood components in VBECS
VBECS Lab Test Results Lookup	4612	Returns a list of VistA Laboratory test results for a patient
VBECS Medication Profile Lookup	4613	Returns a list of medications for a patient from the VistA Pharmacy package
VBECS Lab Accession UID Lookup	4614	Returns data from the VistA Laboratory Services package based on a Lab order number. The data is used to validate a VBECS specimen test request for a patient and specimen received in the blood bank for that test.
VBECS Workload Codes Lookup	4615	Returns a list of blood bank related workload related data that is associated with processes in VBECS
VBECS Patient Lookup	4616	Provides a patient lookup function using standard VistA patient lookup criteria. A list of matching patients found in the lookup is returned to VBECS along with required patient identifiers and demographics.
VBECS Provider Lookup	4617	Provides a lookup of VistA users that hold the PROVIDER security key
VBECS Hospital Location Lookup	4618	Returns a list of hospital locations associated with a division in VistA
VBECS Lab Order Lookup by UID	4633	Returns a list of Laboratory Services data related to an order based on a specimen UID
VBECS Dss Extract	4956	Provides BloodBank post-transfusion related data to the VistA DSS Blood Bank Extract application for DSS reporting
TCPConnect	N/A	The purpose of this RPC is to establish a Broker TCP IP connection. This RPC initiates the initial connection between VBECS and the Broker. This is not yet using the token; this is an initial connection to the required Broker endpoint.
XUS SIGNON SETUP	N/A	The purpose of this RPC is to authenticate user with a Client Agent token during each application's session. This is the IAM Sign on and Setup steps needed prior to validation.
XUS ESSO VALIDATE	N/A	I he purpose of this RPC is to validate a user's token for each session. This is the IAM token validation that occurs inside VistA.
XUS GET TOKEN	N/A	The purpose of this RPC is to return a handle to a token that will sign-on a new process for subsequent RPC calls.

VBECS Windows Services

VBECS uses Microsoft Windows Services (services) to provide minimal downtime and minimal user interaction. These services are installed on each VBECS application server. For details on stopping and starting VBECS services, see the Stopping VBECS Services and Starting VBECS Services sections. All VBECS services start with the VBECS namespace prefix. There are duplicate services for production and test accounts that provide functionality for their respective databases. See Figure 56 for a complete listing of VBECS services.

Services						- 🗆 ×
File Action View	Help					
🗢 🔿 🔲 🧿	😼 🛛 🖬 🛛 🕨 🖿 💷 🕩					
🔍 Services (Local)	Name 🔶	Description	Stat	Startup Type	Log On As	
	CALL TPM Base Services	Enables ac		Manual	Local Service	
	QuPnP Device Host	Allows UPn		Disabled	Local Service	
1	No oper trolle cernec	The per right	0.001.000	riocomo es	color by over	
	WBECS Prod HL7 Dispatcher	Monitors th	Started	Automatic		
	Second HL7 Listener	Receives in	Started	Automatic	-	
	Report Scheduler	Searches f	Started	Automatic		
	VBECS Prod VistALink Listener	Receives in	Started	Automatic		_
	WBECS Test HL7 Dispatcher	Monitors th	Started	Automatic	-	
	WBECS Test HL7 Listener	Receives in	Started	Automatic		
	WBECS Test Report Scheduler	Searches f	Started	Automatic		_
L L	KING VBECS Test VistALink Listener	Receives in	Started	Automatic	-	
	VI WAI DISK	FIGNICES III		Manual	Local System	
	Whware Snapshot Provider	VMware Sn		Manual	Local System	1.00
	Whyare Tools Service	Provides s	Started	Automatic	Local System	
	Q Volume Shadow Copy	Manages a		Manual	Local System	
	Sk Windows Audio	Manages a	Started	Automatic	Local Service	-
	Extended Standard					

Figure 56: Example of VBECS Services

Table 9: VBECS Windows Services

Windows Service Name	Description
VBECS Prod HL7 Dispatcher	The startup type is set to automatic. It polls the VBECS Production database for HL7 messages to be sent to CPRS or BCE in the VistA Production account.
VBECS Prod HL7 Listener	The startup type is set to automatic. This is the default HL7 listener service for all Production HL7 interfaces
VBECS Prod Report Scheduler	The startup type is set to automatic. It runs scheduled VBECS reports for the Production database.
VBECS Prod VistALink Listener	The startup type is set to automatic. It provides a client-server TCP/IP listener service for VistALink RPC XML messages from the VAISS APIs. It calls VBECS RPCs to provide blood bank data from the VBECS Production database to VistA Production account applications.
VBECS Test HL7 Dispatcher	The startup type is set to automatic. It polls the VBECS Test database for HL7 messages to be sent to CPRS or BCE in the VistA Test account.
VBECS Test HL7 Listener	The startup type is set to automatic. This is the default HL7 listener service for all Test HL7 interfaces.
VBECS Test Report Scheduler	The startup type is set to automatic. It runs scheduled VBECS reports for the Test database.
VBECS Test VistALink Listener	The startup type is set to automatic. It provides a client-server TCP/IP listener service for VistALink RPC XML messages from the VAISS APIs. It calls VBECS RPCs to provide blood bank data from the VBECS Test database to VistA Test account applications.

Troubleshooting

Remote Desktop Session Issues

Occasionally remote desktop sessions require disconnection by a server administrator. Sessions may become unresponsive and require disconnection. Additionally, if you need to apply a patch such as a window update but sessions remain on the server you may need to force a session to disconnect. To disconnect a remote session, navigate to the application or SQL server and click Start, Administrative Tools, Remote Desktop Services, Remote Desktop Services Manager. Locate the session(s) that require disconnection. Right-click on the session and select Disconnect (Figure 57).



Figure 57: Example of Remote Desktop Services Manager

Remote Desktop Services Licensing Issues

In order to connect to VBECS, a workstation must have a valid license from an active Remote Desktop Services licensing server. A problem may occur when this license has expired on the workstation; the user receives an error message when trying to establish a Remote Desktop Connection (Figure 58). Deleting the Remote Desktop Services license information from the registry will cause the workstation to refresh its license information and restore the ability to connect using remote desktop.

Figure 58: Example of Expired Remote Desktop License



Deleting the Remote Desktop Services Licensing Information on a VBECS Workstation

Administrative rights on the workstation are required to perform the following steps.

- 1) Log into the workstation that is receiving the error (Figure 58) and click Start, Run...
- 2) In the Run window, type **regedit** and click **Enter**.
- 3) In the Registry Editor window, expand the folders to the following location: Computer, HKEY_LOCAL_MACHINE, SOFTWARE, Microsoft.
- 4) Locate and right-click the **MSLicensing** folder; select **Delete** (Figure 59).

Figure 59: Deleting the MSLicensing Registry Key

🚮 Registry Editor		
<u>File Edit View Favorites Help</u>		
	unityContent 🔺	Name
MSLicensing	Expand	(Default)
MSNInstaller	New •	
E 🛅 MSOSOAP	Eind	
🕀 🧰 MSSearch36	Delete	
	Rename	
My Computer\HKEY_LOCAL_MACHINE	Export	15Licensing

- 5) Make sure you are at the correct path and click **Yes** to confirm the deletion.
- 6) Close the Registry Editor.

Identity Verification Warning

Occasionally, a warning may appear when initiating an RDP session that states that the identity of the remote computer could not authenticated (Figure 60). This is due to an archived certificate and is not dangerous. Select **Don't ask me again**... and click **Yes**.

Figure 60: Example of Identity Warning

Remote Desktop Connection
The identity of the remote computer cannot be verified. Do you want to connect anyway?
The remote computer could not be authenticated due to problems with its security certificate. It may be unsafe to proceed. Name mismatch
Requested remote computer:
Name in the certificate from the remote computer:
Certificate errors
The following errors were encountered while validating the remote computer's certificate:
The server name on the certificate is incorrect.
Do you want to connect despite these certificate errors?
Don't ask me again for connections to this computer
View certificate Yes No

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Stopping and Starting VBECS Services

Stopping VBECS Services

- 1) Click Start, Administrative Tools, Services (Figure 61).
- 2) Right-click on the service you would like to stop and click **Stop**.

Figure 61: Example of Stopping a VBECS Service

🔍 Services						_	
File Action View	Help						
	à 🛃 🚺 📷 🕨 🔲 II 🕪 👘						
🧟 Services (Local)	🔕 Services (Local)						
	VBECS Prod HL7 Dispatcher	Name 🔺	Description	Status	Startup Type	Log On As	_
		C TPM Base Services	Enables ac Allows UPn		Manual Disabled	Local Service Local Service	
		User Profile Service	This servic	Started	Automatic	Local System	
		VBECS Prod HL7 Lis VBECS Prod Report VBECS Prod VistALi VBECS Test HL7 Dis VBECS Test HL7 Lis VBECS Test Report VBECS Test VistALi VITUAI Disk VITUAI Disk	Start Stop Pause Resume Restart All Tasks Refresh Properties	ted ted ted ted ted ted ted	Automatic Automatic Automatic Automatic Automatic Automatic Automatic Manual Manual Automatic	vhamaste vhamaste vhamaste vhamaste vhamaste vhamaste Local System Local System	
	Extended Standard	Thinking Tools Del Vice	- Help		Hacomode	cocar by scolli	<u> </u>
Stop service VBECS Prod	HL7 Dispatcher on Local Computer						

Starting VBECS Services

- 1) Click Start, Administrative Tools, Services (Figure 62).
- 2) Right-click on the service you would like to start and click Start

Figure 62: Example of Starting a VBECS Service

🔍 Services						_	<u> </u>
File Action View	Help						
0 🗊 🖬 🗢 🔷	à 🗟 🛛 📷 🕨 🔳 II 🕩						
Services (Local)	🔕 Services (Local)						
	VBECS Prod HL7 Dispatcher	Name 🔺	Description	Status	Startup Type	Log On As	
		🤹 User Profile Service	This servic	Started	Automatic	Local System	
		VBECS Prod HL7 Dis	Monitors th	Charles of		vhamaste	
		🎑 VBECS Prod HL7 Lis	Receives in	Start	ic	vhamaste	
		🧠 VBECS Prod Report	Searches f	Stop	ic	vhamaste	
		🎑 VBECS Prod VistALi	Receives in	Pause	ic	vhamaste	
		🥋 VBECS Test HL7 Dis	Monitors th	Kesume	ic	vhamaste	
		🤹 VBECS Test HL7 Lis	Receives in	Restart	ic	vhamaste	
		🥘 VBECS Test Report	Searches f	All Task	s ⊧ic	vhamaste	
		🤹 VBECS Test VistALi	Receives in		ic	vhamaste	
		🎑 Virtual Disk	Provides m	Refresh	1	Local System	
		🎑 VMware Snapshot	VMware Sn	Proper	ties	Local System	
		🎑 VMware Tools Service	Provides s		ic	Local System	-
	Extended Standard	est"		– Help			

VBECS Auditing

For a complete list of audited server events, please see: Appendix C: Auditing on VBECS Servers.

VBECS Exception Logging

VBECS logs all errors that occur in the system in the Application log of Event Viewer on the application server. A user defined as an administrator on the application server can connect to the server through Remote Desktop Connection to view these errors.

- Click Start, Control Panel, Administrative Tools.
- Open the Event Viewer and open the Windows logs folder, then select Application to view the errors that VBECS logs.
- In the list view on the right side of the screen, click the date column header to sort the errors by date.
- Evaluate "Error" and warning errors that were logged at the same time a VBECS user reported an error. Ignore informational messages. If you require assistance from the VBECS maintenance team, file a support ticket (Service Desk Primary Contact).

VBECS Application Interfaces

When the HL7 Listener service encounters an error parsing an HL7 message it generates an event description like the following:

VBECS Patient Update HL7 Parser: Error processing HL7 message: Missing or invalid content in HL7 message: ERR^MSH~1~12~203~

Upon troubleshooting an email message regarding an HL7 message, file a ticket with the Service Desk Primary Contact and include the contents of the email for a description so that Health Product Support can assist in identifying the patient associated with the failed HL7 message. Due to PII and HIPAA constraints, patient information will not be sent over email. Product support will have access to the event viewer and be able to identify the appropriate patient information. Table 10 describes the ERR codes (e.g., 203 like in the above example) descriptions.

Error Code	Description of Problem
100	Segment Sequence Error
101	Required Field Missing
102	Data Type Error
103	Table Value Not Found
200	Unsupported Message Type
201	Unsupported Event Code
202	Unsupported Processing ID
203	Unsupported Version Id
203	See Table 11: VBECS HL7 Versions.
204	Unknown Key Identifier
205	Duplicate Key Identifier
206	Application Record Locked
207	Application Internal Error
208	Conflicting Processing Id

Table 10: Trouble	shooting Rejected	VBECS HL7	Messages
-------------------	-------------------	-----------	----------

Table 11: VBECS HL7 Versions

HL7 Interface	HL7 Version
VistA CPRS- Order Update – CPRS OERR	2.4
VistA PIMS Patient ADT Update – VAFC ADT	2.3
VistA MPI/PD PatientMerge – MPI TRIGGER	2.4
BCE COTS – Patient Blood Product Transfusion Verification	2.5
Automated Instrument	2.4

Table 12: Troubleshooting VBECS Application Interfaces

Source	Description of Problem	Possible Cause	Solution
		The OERR-VBECS Logical Link is not running on the VistA system.	Start the OERR-VBECS Logical Link.
		The VBECS <prod or="" test=""> HL7 Listener Windows Service is not running or is locked on the application server.</prod>	Start or restart the VBECS <prod or="" test=""> HL7 Listener Windows Service.</prod>
		Network connectivity issue	Contact local system support.
VBECS: Order Alerts and Pending Order List	New orders or cancellations of existing orders in CPRS are not showing up in VBECS.	The HL7 message is missing patient name or one or more name components length(s) exceed(s) the VBECS maximum supported value.	VBECS responds to the new order request with an application reject (AR) acknowledgement message indicating Patient Name(s) not found in HL7 Message or Patient's Name(s) field size(s) exceed(s) VBECS maximum supported value. Rejected patient order messages due to invalid patient name message content are recorded on the Windows Event Log (Finding Application Log Entries from Email Alerts) and an email message containing the MSH segment of the rejected HL7 message.
VBECS Admin: Edit Division	New orders are not showing up in VBECS.	Order mappings to institutions within a division's configuration were changed.	Stop and restart the VBECS <prod or="" test=""> HL7 Listener Service.</prod>
VBECS: Patient	VistA patient updates are	The patient being updated in VistA is not in the VBECS Patient table and is, therefore, not a blood bank patient.	No action is required.
Update Alerts	not showing up in VBECS.	The fields that were updated in VistA are not stored in VBECS; therefore, no data will be updated.	No action is required.

Source	Description of Problem	Possible Cause	Solution
		The Taskman scheduled option VAFC BATCH UPDATE is not scheduled to run or has not reached the time limit in the schedule.	Schedule the VAFC BATCH UPDATE option to run at the desired frequency (the recommended frequency is every 10 minutes) or use the option "One-time Option Queue" in the Taskman Management Options to start the task.
		The VBECSPTU Logical Link is not running on the VistA system.	Start the VBECSPTU Logical Link.
		The VBECS <prod or="" test=""> HL7 Listener Windows Service is not running or is locked on the application server.</prod>	Start or restart the VBECS <prod or="" test=""> HL7 Listener Windows Service.</prod>
		Network connectivity issue	Contact local system support.
		The HL7 message is missing patient name or one or more name components length(s) exceed(s) the VBECS maximum supported value.	VBECS responds to the patient update request with an application reject (AR) acknowledgement message indicating Patient Name(s) not found in HL7 Message or Patient's Name(s) field size(s) exceed(s) VBECS maximum supported value. Rejected patient update messages due to invalid patient name message content are recorded on the Windows Event Log (Finding Application Log Entries from Email Alerts) and an email message containing the MSH segment of the rejected HL7 message as a means to identify the message in the server event log is sent to the interface failure alert recipient set in VBECS Administrator for immediate action
		The two patient identifiers in the merge do not exist in VBECS and, therefore, cannot be merged.	No action is required.
VBECS: Patient	VistA Patient Merge events are not showing up	The VBECPTM Logical Link is not running on the VistA system.	Start the VBECSPTM Logical Link.
	in VBECS.	The VBECS <prod or="" test=""> HL7 Listener Windows Service is not running or is locked on the application server.</prod>	Start or restart the VBECS <prod or="" test=""> HL7 Listener Windows Service.</prod>
		Network connectivity issue	Contact local system support.

Source	Description of Problem	Possible Cause	Solution
		The HL7 message is missing patient name or one or more name components length(s) exceed(s) the VBECS maximum supported value.	Failed patient merge messages due to invalid patient name message content are recorded on the Windows Event Log and an email message containing the MSH segment of the rejected HL7 message as a means to identify the message in the server event log is sent to the interface failure alert recipient set in VBECS Administrator for immediate action.
	The VistA HL7 System Link Monitor shows more MESSAGES TO SEND than MESSAGES SENT for the OERR-VBECS	The VBECS <prod or="" test=""> HL7 Listener Windows Service is not running or is locked on the VBECS Application server.</prod>	Start or restart the VBECS <prod or="" test=""> HL7 Listener Windows Service.</prod>
	Logical Link and is hung in an "Open" state.	Network connectivity issue	Contact local system support.
VistA: HL7 System Link Monitor	The VistA HL7 System Link Monitor shows more MESSAGES TO SEND than MESSAGES SENT for the VBECSPTU Logical Link and is hung in an "Open" state. The VistA HL7 System Link Monitor shows more MESSAGES TO SEND than MESSAGES SENT for the VBECSPTM Logical Link and is hung in	The VBECS <prod or="" test=""> HL7 Listener Windows Service is not running or is locked on the VBECS Application server.</prod>	Start or restart the VBECS <prod or="" test=""> HL7 Listener Windows Service.</prod>
		Network connectivity issue.	Contact local system support.
		The VBECS <prod or="" test=""> HL7 Listener Windows Service is not running or is locked on the application server.</prod>	Start or restart the VBECS <prod or="" test=""> HL7 Listener Windows Service.</prod>
	an "Open" state.	Network connectivity issue.	Contact local system support.
CPRS: Orders Tab	CPRS does not display the correct status of a blood bank order after it was	HL7 Dispatcher Windows Service is not running or is locked on the application server.	Start or restart the VBECS <prod or="" test=""> HL7 Dispatcher Windows Service.</prod>
	updated in VBECS.	The VBECS-OERR Logical Link is not running.	Start the VBECS-OERR Logical Link.
		Network connectivity issue	Contact local system support.
CPRS: Blood Bank Order Dialog	CPRS displays "Not able to open port" message in Patient Information screen in Blood Bank Order	The VBECS <prod or="" test=""> VistALink Listener Service is not running or is locked on the VBECS Application server.</prod>	Start or restart the VBECS <prod or="" test=""> VistALink Listener Service.</prod>
	Dialog.	Network connectivity issue	Contact local system support.
CPRS: Reports Tab, Blood Bank Report	CPRS displays "	Ine VBECS <prod or="" test=""> VistALink Listener is not running or is locked on the VBECS Application server.</prod>	Start or restart the VBECS <prod or="" test=""> VistALink Listener Service.</prod>
	IS UNAVAILARI F"	Network connectivity issue.	Contact local system support.
	IS UNAVAILABLE"	Incorrect parameters file	Verify settings are pointing to the correct VBECS application server and port.
Source	Description of Problem	Possible Cause	Solution
--	---	---	---
CPRS: Blood Bank Order Dialog: Signing an Order	CPRS displays an "Error Saving Order" dialog screen with the text "The error, One or more orders to the VBECS system failed and are gueued for	An error occurred in the VBECS <prod or="" test=""> HL7 Listener Windows Service, which caused a failure to respond to CPRS with acceptance.</prod>	Log onto the application server and review the System Application Event Log for error details.
	later delivery."	Network connectivity issue.	Contact local system support.
VECO	An application error has been logged to the Event Log where the Message under Exception Information is "Could not access 'CDO.Message' object."	The VBECS <prod or="" test=""> HL7 Listener Windows Service has encountered an error trying to send an email message to the Interface Administrator.</prod>	Disable port 25 blocking in McAfee. Open the VirusScan Console and select Access Protection. Click the Task menu option, the Properties. Uncheck Prevent mass mailing worms from sending mail, port 25 under Ports to block.
Application Server Application Event Log: Source is VBECS	An application warning was logged in the Event Log with the description stating, "An unsupported HL7 message was	If the IP address is associated with the local VistA system, the HL7 Application Parameters in VistA were not set up correctly for the supported protocols.	Refer to the VBECS Application Interfacing Support Software Installation and User Configuration Guide for HL7 setup procedures in VistA.
SimpleListener	received from IP Address [IP address]." The IP address in the description of the error will indicate where the message is coming from.	If the IP address is not from the local VistA system, a rogue HL7 system is sending messages to the VBECS server.	Contact IRM to identify the location of the server with which the IP address is associated. Notify the site that the message is coming from the problem so that the messages can be routed to the correct location.
VBECS Application Server Application Event Log: Source is VBECS HL7 MailServer	An application error was logged in the Event Log with the source of VBECS HL7 MailServer where the Message under Exception Information is, "Could not access 'CDO.Message' object."	The VBECS <prod or="" test=""> HL7 Listener Windows Service encountered an error trying to send an email message to the Interface Administrator.</prod>	Disable port 25 blocking in McAfee. Open the VirusScan Console and select Access Protection. Click the Task menu option, Properties. Uncheck Prevent mass mailing worms from sending mail, port 25 under Ports to block.
VBECS Application	An HL7 message sent from CPRS to VBECS was rejected. The description in the Event Log is "Exception message: Division [<i>division</i>] is not supported by this instance of VBECS."	An invalid or unsupported division associated with the Patient Location was selected in CPRS when the order was created.	The order must be created in CPRS again with a valid Patient Location associated with a VBECS-supported division.
Server Application Event Log: Source is CPRS HL7 Parser	An HL7 message sent from CPRS to VBECS was rejected. The description in the Event Log is "Exception message: Unable to find valid Associated Institutions information. Please check configuration in VBECS Admin."	Clinician logs into VistA with a division that is not mapped to VBECS.	The order must be created in CPRS again with a division that is mapped to VBECS.

Source	Description of Problem	Possible Cause	Solution
Automated Instrument	Messages not being received from the instrument.	The VBECS <prod or="" test=""> HL7 Listener Windows Service is not running or is locked on the VBECS Application server.</prod>	Start or restart the VBECS <prod or="" test=""> HL7 Listener Windows Service.</prod>
CPRS	Transfusion Reactions imported during initial VistA conversion are being displayed under the VBECS section of the CPRS Blood Bank Report. The Unit ID fields display "Unknown".	This is a code defect. VBECS is sending converted transfusion reaction records to populate both the VBECS section and Legacy VistA section.	Entries with a Unit ID field of "Unknown" can be ignored. Transfusion Reactions processed in VBECS are displayed correctly in the VBECS section.

Finding Application Log Entries from Email Alerts

When HL7 message patient last or first name components length(s) exceed(s) the VBECS maximum supported value of 40, an email will be received (Figure 63).

Figure 63: Example of Error in VBECS HL7 Listener for CPRS

C .	🚽 🖻 😈 🔺 🗸	🗸 🗧 Error	in VBECS HL7 Listener fo	or CPRS - Message (Plain T	ext)		-	= x
	Message							۲
Reply	Reply Forward to All Respond	Delete Move to Create Other Folder ~ Rule Actions ~ Actions	Block Not Junk Sender Junk E-mail	Categorize Follow Mark as Up ~ Unread Options	 A Find A Related ▼ Select ▼ Find 	Send to OneNote OneNote		
This n	iessage was sent wi	ith High importance.						
From:	VBECS.HL7@	med.va.gov					Sent: Mon 6/13/2011	1:09 PM
To: Cc:			-					
Subject	Error in VBE	CS HL7 Listener for CPRS						
The	The VBECS HL7 Multi Listener Windows Service received an unsupported HL7 message from IP Address							
The	Patient's Fu	ll Name field size (41)	exceeds VRECS max	imum supported value	(30 chara	cters)		
ine	Facienci 5 Fu	11 Walle Field Size (41)	exceeds volco max	imum suppor ceu varue	(50 chara	ccers).		
The	The Message ID is: MSH ^~\& 0ERR 589 VBECS 589 20110613160830-0500 0MG^019 5894256439 T 2.4 AL AL USA							
Plea	Please check the server event log for the full HL7 message details.							
								-

1) On the Application Server, click Start, Administrative Tools, Event Viewer.

2) On the Event Viewer Window, expand the **Windows Logs** and click on **Application** in the lefthand tree; click the top event in the log table, then click **Find** on the right side of the window (Figure 64).

🛃 Event Viewer _ 🗆 🗙 <u>File Action View Help</u> 🗢 🔿 🔰 🔽 🗖 Event Viewer (Local) Application Number of events: 4,883 Actions Ŧ 🛱 Custom Views Application Date and Time Source Event ID Task C. -Level ws cogs Infor 6/14/2013 11:34:51 AM Winlogo 4101 None Open Saved Log... Application **.** Error 6/14/2013 11:25:21 AM VBECS 0 None mail Create Custom View... 6/14/2013 10:13:56 AM Setup Information CertificateServicesClient-CertEnroll 64 None System Information 6/14/2013 10:13:56 AM CertificateServicesClient-CertEnroll 65 None Import Custom View... Forwarded E 6/14/2013 10:13:52 AM 🔔 Warning SceCli 1202 None Clear Log... 🛨 🛗 Applications and Error 6/14/2013 9:49:04 AM VBECS 0 None Calibric Subscriptions Filter Current Log... 7 Error 6/14/2013 9:42:37 AM VBECS 0 None Properties Event 4101, Winlogon × Find... General Details Windows license validated. Attach a Task To this Log... View ۲ a Refresh ? Help • Log Na<u>m</u>e: Application Winlogon 6/14/2013 11:34:51 AM Source: Logge<u>d</u>: Event 4101, Winlogo Event ID: 4101 Task Category: None Event Properties Information Keywords: Classic Level: Attach Task To This Event... N/A Computer: User: ۲ Copy Info OpCode: Save Selected Events... More Information: Event Log Online Help Refresh • ۲ 2 Help ▼ Ŀ

Figure 64: Example of Event Viewer

3) Paste the **MessageID** highlighted in the email received (Figure 63) in the **Find What** text box. Click **Find Next** (Figure 65).

Figure 65: Example of Find in Local Application



4) When the event record has been found, the row will be highlighted (Figure 66).

Figure 66: Example of Message ID Located in Event Log

🛃 Event Viewer							
<u>File Action View H</u>	lelp						
🗢 🔿 🖄 📅 🛛							
Event Viewer (Local)	Application Number	of events: 4,883				Ac	tions
Custom Views	Level Da	te and Time	ource	Event ID	Task C	Ар	plication 🔺 📥
Application	Information 6/1	13/2013 11:34:02 AM Re	esponse message from O	PRS 0	None		Open Saved Log
Security	Information 6/1	13/2013 11:34:02 AM O	utbound message to CPR	S 0	None	🖕	Create Custom View
Setup	Information 6/1	13/2013 11:33:57 AM Re	esponse message from C	PRS 0	None	ש	
System	Information 6/1	13/2013 11:33:57 AM O	utbound message to CPR	S 0	None	_	Import Custom View
E Porwarded E Applications and	Information 6/1 Information 6/1	13/2013 11:32:02 AM Re 13/2013 11:32:02 AM O	utbound message from C	S 0	None		Clear Log
Subscriptions	Information 6/1	L3/2013 11:31:57 AM Re	esponse message from O	PRS 0	None 🔻		Filter Current Log
	Event 0 Response me	scade from CBRS			¥	i	Properties
	Evene 0, Response me	sagenoments					Find
	General Details						Cours All Events An
							Save All Events As
	MSHI^~\& OERR	589 VBECS 589 20130613113	357-0500 ORG^O20 58	394304024 T 2.4 US	A		Attach a Task To this Log
		01511575015					View 🕨
						a	Refresh
	Log Name	Application				2	Help
	Log Name:	Application	DI Lawredt 6/	12/2012 11.22.57 AM	.		
	Source:	A A A A A A A A A A A A A A A A A A A	.Fr Logge <u>u</u> : 0/	15/2015 11:55:57 Alv	·	Ev	ent 0, Response message f 🔺
	Event ID:	U Lafarrantia a	Task Category: N	one			Event Properties
	Levei:	Information	Keywords: Cl	assic	.	1	Attach Task To This Event
	User:	N/A	Compute <u>r</u> :	/ha.	med.va.gov	Bb	Conv
	OpCode:						Source Selected Supply
	More Information:	Event Log Online Help					save selected events
						a	Refresh
						2	Haln
]							

5) Click **Cancel** to close the Find window (Figure 65).

6) Double-click on the highlighted row (Figure 67).

Figure 67: Example of Event Properties

👫 Event Viewer		
Eile Action ⊻iew Help		
	? 🖬	Event Properties
Event Viewer (Local) Application System Internet Explorer	Application 211 event(s) Type Date Type Date Transmission 6/13/2011 Transmission 6/13/2011	Event Date: S/15/2011 Source: VBECS SimpleListener Time: 4:08:30 PM Category: None Type: Error Event [D: 0 User: N/A Cgmpute: Description: The VBECS HL7 Multi Listener Windows Service received an unsupported HL7 message from IP Addres: Hersage Received: MSSHT**VADERRBSM%ECS/BSB/20110613160830-0500(0MG*019) SB94266437124(IIIALUSA Date: Bytes C Words OK Cancel Apply 12:10:17 PM Response Message None 0 N/A Control Intervent Manage None 0 N/A

 If the Message ID in the email is part of the Message Receive information in the Event Properties, analyze the detail message to identify the Patient Information causing the error (Figure 68).

Figure 68: Example of Analyzing Event Properties

ent Prop	oerties			?
Event				
Date: Time:	10/8/2010 12:07:22 PM	Source:	VBECS SimpleListener	+
Type:	Error	Event ID:	0	+
User:	N/A			Ba
Compute				
Descript				
Descript	JURI.			
subbout	ea vaiue (30 cha	racters).		لفر
Messac	e Received:			
MSHI	16/UERH[589]VI	BECS[583]2	0101008120722-0500	JMG UTS
003423 DID IIIE0	7361112.4091.0	CUSA 1720000LIL	CCC1000000000000	2221
PIDIID	00041517V5260	ONGNAM	55 41 E10LONGNAME10LON	CNAME10
^AII199	90904IM	LONGNAM	E TOLONGNAME TOLON	CANAME TO
PV1IDI	CO.4/S ADDRE	SS/PHONE		-
It is they	CO A CAPPIL	5071 HOIR		
Data: (Butes C We	nde		
	- 11 or 110	1999		11.00
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				the second s
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			<u></u>	×

8) If the Message ID in the email is not found in the Message Received, proceed to the next error by repeating Steps 3 through 7.

Zebra Printer Problems

Problem: The printer prints, but there is no text on the label or text is too light.

Probable Cause: The printer is out of ribbon or the DARKNESS setting is too light (Figure 69).

Solution: Increase the DARKNESS setting after verifying printer has ribbon.

Figure 69: Example Zebra Printer Settings

View Printer Co	onfiguration
VA 060876.06 GY0902	05.34901-010.E.VT
(+10	DARKNESS)
2 IPS	PRINT SPEED
+000	TEAR OFF
TEAR OFF	PRINT MODE
NON-CONTINUOUS	MEDIA TYPE
WEB	SENSOR TYPE
AUTO SELECT	SENSOR SELECT
(THERMAL-TRANS.	PRINT METHOD
105 08/12 MM	PRINT WIDTH
1221	LABEL LENGTH
39.0IN 988MM	MAXIMUM LENGTH
BIDIRECTIONAL	PARALLEL COMM.
RS232	SERIAL COMM.
9600	BAUD
8 BITS	DATA BITS
NONE	PARITY
XON/XOFF	HOST HANDSHAKE
NONE	PROTOCOL
000	NETWORK ID
NORMAL MODE	COMMUNICATIONS
(<~> 7EH	CONTROL PREFIX
<^> 5EH	FORMAT PREFIX
<,> 2СН	DELIMITER CHAR
(ZPL II	ZPL MODE
CALIBRATION	MEDIA POWER UP
CALIBRATION	HEAD CLOSE

Problem: The printer does not print. It also cannot be pinged or be seen in a web browser (Figure 70).

Probable Cause: Network settings are not correct on the printer

Solution: Correct the printer's network settings. All printer manuals may be found on the VBECS SharePoint.

Figure 70: Example of Zebra Printer Web Console



Problem: The printer does not print and network settings have been verified (see previous).

Probable Cause: One or more settings are incorrect.

Solution: Verify that the PRINT METHOD, CONTROL PREFIX, FORMAT PREFIX, DELIMITER CHAR and ZPL MODE match the settings in Figure 69.

Problem: The printer is online and network settings have been verified (see previous), but the printer fails to print.

Probable Cause: The network is blocking the printer, most likely due to a firewall. Test with Telnet PowerShell script. You may find it on **D:\VBECS-Tools**\ (App Server) (Figure 71). Read the accompanying **readme** file for instructions.

Solution: Open the firewall to the printer on port 9100.

Figure 71: Example of Telnet test setup



Scanner Problems

Problem: When scanning, a ` character appears at the start of the scan.

Probable Cause: The Caps Lock is on.

Solution: Turn the Caps Lock off.

Problem: When scanning, characters appear in the field that do not match the label being scanned. Often, the bad characters are not alphanumeric.

Probable Causes: Remote Desktop setting or network latency causes data to become corrupted.

Solution #1: First, try adjusting the keyboard settings in Remote Desktop Connection. Change the **Keyboard** setting to **On the local computer** (Figure 8). If this does not work, try solution #2.

Solution #2: The lab supervisor will program an inter-character delay into the scanner to fix the issue. This puts a small time-delay between each character as it is sent over the network, which results in slightly slower scan speeds.

Figure 72 through Figure 79 are configuration barcodes arranged from a 10-millisecond inter-character delay all the way up to an 80-millisecond delay respectively. We suggest that you start with the 10-

millisecond delay. If that does not resolve the problem, proceed with larger delays until the problem is corrected.

Note that these barcodes include all of the configuration information for the scanners. There is no need to scan any additional barcodes to configure the scanner.

Figure 72: 10 milliseconds



Figure 73: 20 milliseconds



Figure 74: 30 milliseconds



Figure 75: 40 milliseconds



Figure 76: 50 milliseconds



Figure 77: 60 milliseconds



Figure 78: 70 milliseconds



Figure 79: 80 milliseconds



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Archiving and Recovery (Enterprise Operations Only)

The VBECS database will be backed up once daily and the backup to tape can be taken any time after 1:00 AM (CST).

Assumptions

- The SQL Server job that backs up the database is running correctly.
- Replacement hardware will have a tape drive that is compatible with the one lost in the disaster.

Outcome

• VBECS data is successfully recovered.

Limitations and Restrictions

None

Additional Information

None

Restore the Databases

If you find the need to perform a database restore and require assistance, file a support ticket (Service Desk Primary Contact) for the VBECS Maintenance Team.

Service Desk Primary Contact

See Customer Support section of VBECS 2.3.0 Release Notes.

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Failover

VBECS does not have a seamless failover mechanism. If an application server fails, the user will receive a message that the remote connection was lost. VBECS will lose information entered since the last save. The user must reopen a Remote Desktop Connection session. The user will have to reenter all information that was lost since the last save.

The connection between VBECS and VistA can be lost for a number of reasons:

An application server can fail or the VistA server can fail. When this connection is lost, no messages can be exchanged. When the connection between VBECS and VistA is lost due to a failure of VBECS, the messages are queued on the VistA side. Orders placed during this downtime will remain in the queue. Once the VBECS system recovers and a connection is reestablished with VistA, the messages come across. The order alerts icon located in the VBECS status bar will display the orders that were in the queue at the time of failure. An application server can fail because of a vSphere failure. If the underlying physical host that VBECS resides on fails, the VBECS servers will fail too. vSphere clustering will restore the server on another host.

If a user's client workstation fails in the middle of a VBECS session, the session remains active on the server for a period set by the server administrator. The standard session time-out is 15 minutes. If the user resolves the issues with the client workstation and reconnects to the VBECS server through Remote Desktop Connection before the session times out, the session will remain as it was when the client failed.

VBECS uses a feature within Microsoft SQL Server 2012 called AlwaysOn. SQL Server AlwaysOn provides both High Availability (HA) and Disaster Recovery for VBECS databases. HA is implemented within one datacenter through synchronous replication. If a primary SQL server should fail, the VBECS application is automatically directed to use the databases on the HA SQL server. This is a seamless failover and occurs automatically with no intervention needed. The previously defined HA server becomes the new primary server and when the original primary server recovers, it becomes the new HA server. This will occur during normal maintenance of the servers during Windows update deployment on a monthly basis as those servers are rebooted. Using the same AlwaysOn technology, disaster recovery is implemented through asynchronous replication between the primary data center and a disaster recovery data center. Unlike the HA configuration, activating a disaster recovery server requires manual intervention.

If the VBECS user is in the process of performing a query at the exact second a synchronous failover takes place, they are presented with the message shown in Figure 80:

Figure 80: Synchronous Failover Message



Once the VBECS user clicks OK, any open child dialogs automatically close to preserve data integrity. They may proceed to use VBECS and will not see this message again. This message could present itself in the event of a disaster recovery failover as well. In that case, the system will not recover automatically and the VBECS user continues to see this message every time they try to query the database. Manual failover recovery to the disaster recovery server takes place through written instructions defined in the Disaster Recovery Plan and requires the intervention and expertise of the datacenter and VBECS maintenance teams.

Performance

VBECS may delay a critical function such as patient transfusion if the network suffers latency issues. File a support ticket (Service Desk Primary Contact) per local procedures when latency issues arise. VBECS was re-factored after performance testing results showed latency issues for VistA queries. As a result, many queries are cached in the VBECS database. Due to the criticality of having correct and current patient data, patient lookups cannot be cached.

Locking

VBECS is designed with pessimistic locking controlled within the application code: if one user selects a record for edit, the record is locked by that user. If another user tries to edit that record, a message will tell him that the record is locked and who has the record. The second user is not granted access to the record. Locks have a timeout period defined in the edit divisions portion of the VBECS Administrator application (refer to the *VistA Blood Establishment Computer Software (VBECS) Admin User Guide)*. When a lock times out or is released by a user completing his edit, another user can edit that record.

If the application code fails due to a logic bug, optimistic locking is in place to prevent data corruption. When a record is retrieved, a row version is also retrieved. When a record is saved, the row in the database gets an updated row version; before the save takes place, the save routine checks that the row version supplied matches the row version in the table. If it does not match, the routine notifies the caller that another user changed the data. The save does not complete; the user must retrieve the updated record and start his edits again.

If VBECS had an application error resulting in the application terminating, locks may have to be manually deleted. Contact the Service Desk Primary Contact.

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Security

VBECS contains sensitive data and performs a critical function, so it is critical to secure the system. It is important to secure the server from both users and malicious attacks from an individual who is trying to gain access to the system.

Access Request Process

To gain access to the VBECS server, reference the VBECS SharePoint site: (<u>http://vaww.oed.portal.va.gov/projects/vbecs/default.aspx</u>).

 \mathbb{R}^{2} A NMEA must be used at all times to access a VBECS server with administrator access.

Active Directory

Access to the VBECS servers is controlled through AD. Each VBECS site will have two groups set up in AD, one for normal VBECS users and one for VBECS Administrators (this is not a server administrator). Unless the user is a server administrator, he must be a member of one of these two groups to gain access to the server.

These groups also play a role in application level security. Even if a user were able to access the server, he would not be able to access VBECS.

Group Policy

Group policy controls the user experience (what the user sees and has access to on the VBECS server). To configure this correctly, the recommendations in "*Windows Server 2008 R2 Security Guide*" (Microsoft Web site) were followed to establish a baseline for group policy.

Group policy can be applied to user accounts or to the servers directly. In the case of VBECS, group policy is applied to the servers (it is easier to manage). It is also undesirable to have group policy associated with the user, which may inhibit his use of other systems. Enabling loopback processing applies the policy to any user that logs into the server.

In some cases, group policy also enables VBECS to perform actions on the Windows operating system. For example, there is a group policy setting that allows the VBECS services to be restarted after a configuration change in VBECS Administrator.

System Center Operations Manager

SCOM is a proactive monitoring tool. SCOM will constantly monitor each server for system abnormalities. If SCOM detects a problem, an email will be sent to the system administrator defined during the SCOM installation process. SCOM will monitor these high-level categories:

- Windows Server 2008 R2 Operating System
- CPU health and usage
- Network interface cards
- SQL Server (SQL Clustering and SQL AlwaysOn)
- Memory usage
- Hard-disk health and usage
- VBECS files and services

Windows Services

Application-Wide Exceptions

Table 13 explains system exceptions to aid VA Health Product Support in determining the cause and resolving system issues.

System Exceptions	Description
ArgumentException	Base class for all argument exceptions
ArgumentNullException	Thrown by methods that do not allow an argument to be null
ArgumentOutOfRangeException	Thrown by methods that verify that arguments are in a given range
ComException	Exception encapsulating COM HRESULT information
Exception	Base class for all exceptions
	Base class for exceptions that occur or are targeted at environments
ExternalException	outside the runtime
IndexOutOfRangeException	Thrown by the runtime only when an array is indexed improperly
InvalidOperationException	Thrown by methods when in an invalid state
NullReferenceException	Thrown by the runtime only when a null object is referenced.
SEHException	Exception encapsulating Win32 structured exception handling information
	A base class for exceptions that occur during arithmetic operations, such
System.ArithmeticException	as System.DivideByZeroException and System.OverflowException
	Thrown when a store into an array fails because the actual type of the
System.ArrayTypeMismatchException	stored element is incompatible with the actual type of the array
System.DivideByZeroException	Thrown when an attempt to divide an integral value by zero occurs
	Thrown when an attempt to index an array via an index that is less than
System.IndexOutOfRangeException	zero or outside the bounds of the array
	Thrown when an explicit conversion from a base type or interface to a
System.InvalidCastException	derived type fails at run time
	Thrown when a null reference is used in a way that causes the referenced
System.NullReferenceException	object to be required
System.OutOfMemoryException	Thrown when an attempt to allocate memory (via new) fails
System.OverflowException	Thrown when an arithmetic operation in a checked context overflows
	Thrown when the execution stack is exhausted by having too many
	pending method calls; typically indicative of very deep or unbounded
System.StackOverflowException	
	I hrown when a static constructor throws an exception, and no catch
System. I ypeInitializationException	clauses exist to catch it
SystemException	Base class for all runtime-generated errors

Table 14 explains the event sources that VBECS uses to write to the Application log in Event Viewer (Finding Application Log Entries from Email Alerts).

Event Source	Description
VBECS Exception	A VBECS system crash
VBECS Prod	VBECS Production
VBECS Test	VBECS Test
VBECS Admin Prod	VBECS Administrator Production
VBECS Admin Test	VBECS Administrator Test
HL7Dispatcher Prod	
HL7Dispatcher Test	
HL7Service Prod	
HL7Service Test	
ReportScheduler Prod	
ReportScheduler Test	
VistaLinkService Prod	
VistaLinkService Test	VBECS Services

Table 14: Event Sources

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Configuring the App Server and Lab Workstations

After the App Server is deployed, additional configuration will need to be performed on it and on the lab workstations. On the server, install the printer, configure permissions and create the Report share. On the workstation, create a shortcut to the report share.

Server Tasks (Enterprise Operations Only)

Perform the following tasks on the App Server only.

Grant User Permissions

- 1) Open a remote desktop connection to the VBECS App Server and login with server administrator privileges.
- 2) Click Start, Administrative Tools, Computer Management. Expand Local Users and Groups. Select Groups and double-click Remote Desktop Users (Figure 81).

Figure 81: Computer Management

🛃 Computer Management				
<u>File Action View H</u> elp				
🗢 🔿 🙍 📅 🧕 🔒 👔				
Computer Management (Local)	Name	Desc🔺	Actions	
🖻 🎁 System Tools	Network Configuration	Merr	Groups	_
Task Scheduler	Reformance Log Users	Merr		
Event Viewer	🕭 Performance Monitor U	Merr	More Actions	•
🛨 🛐 Shared Folders	A Power Users	Pow		
🖃 🎥 Local Users and Group:	Print Operators	Merr		
	Arrow Remote Desktop Users	Merr		
	A REDUCTION	Supr		
E N Perrormance		Ucer		
🛁 Device Manager 🔤		Marrie		
🕒 🕀 🚰 Storage 📃 🗾	TS Web Access Comput	Men		
		►		

3) Click Add (Figure 82).

Figure 82: Remote Desktop Users Properties

Remote Desktop U	sers Properties	? ×
General		
🧟 Remote	Desktop Users	
D <u>e</u> scription:	Members in this group are granted the right to logon remotely	
<u>M</u> embers:		
Add	Bemove Changes to a user's group members are not effective until the next time tuser logs on.	hip (he
	JK Cancel <u>Apply</u> He	elp

- 4) Specify the VBECS Users and VBECS Administrators group (Figure 83). Note that groups typically follow this naming convention (substitute the 3-letter site code for sss):
 - VBECS Users: VHAsssVbecsUsers
 - VBECS Administrators: VHAsssVbecsAdministrators
 - Click **OK** to close the window. Click **OK** again to close the **Properties** window.

Figure 83: Example of Select Users, Computers...

Select Users, Computers, Service Accounts, or Groups	? ×
Select this object type:	
Users, Service Accounts, or Groups	Object Types
Erom this location:	
vha.med.va.gov	Locations
Enter the object names to select (<u>examples</u>):	
	<u>C</u> heck Names
Advanced OK	Cancel

Configure the Report Share

- 1) Open a remote desktop connection to the VBECS App Server and login with server administrator privileges.
- 2) Open Windows Explorer and navigate to the **D** drive.
- 3) Right-click on VBECSReports and click Properties. Select the Security tab and click Edit (Figure 84).

Figure 84: Example of VBECSReports Properties

📒 VBECSReports Properties		×
General Sharing Security Previo	us Versions 🗍	Customize
Object name: D:\VBECSReports		
<u>G</u> roup or user names:		
& CREATOR OWNER		
SYSTEM		
& Administrator		
To change permissions, click Edit.		<u>E</u> dit
Permissions for Users	Allow	Deny
Full control		_
Modify		
Read & execute	~	
List folder contents	~	
Read	~	
Write		-
For special permissions or advanced click Advanced.	l settings,	Advanced
Learn about access control and per	missions	
ОК	Cancel	Apply

4) Click Add (Figure 85).

Figure 85: Example of Permissions

🕌 Permissions for ¥BECSReport	s	×
Security		
Object name: D:\\BECSReport	ts	
<u>G</u> roup or user names:		
& CREATOR OWNER		
SYSTEM		
Administrators (Treason Treason		
용 User		
	A <u>d</u> d	<u>R</u> emove
Permissions for CREATOR OWNER	Allow	Deny
Full control		
Modify		
Read & execute		
List folder contents		
Read		
Learn about access control and p	ermissions	
OK	Cancel	Apply

- 5) Specify the VBECS Users and VBECS Administrators group (Figure 86). Note that groups typically follow this naming convention (substitute the 3-letter site code for sss):
 - VBECS Users: *VHAsssVbecsUsers*
 - VBECS Administrators: VHAsssVbecsAdministrators

Click **OK** to close the window.

Figure 86: Example of Select Users, Computers...

Select Users, Computers, Service Accounts, or Groups	? ×
Select this object type:	
Users, Service Accounts, or Groups	<u>O</u> bject Types
Erom this location:	
vha.med.va.gov	Locations
Enter the object names to select (<u>examples</u>):	
	<u>C</u> heck Names
Advanced OK	Cancel

6) In the **Permissions** window, assign **Write** access to both groups in addition to the rights granted by default. Click **OK** (Figure 87).

Figure 87: Example of Permissions

🕌 Permissions for ¥BECSReport	s	×
Security		
Object name: D:\VBECSRepor Group or user names: CREATOR OWNER SYSTEM Administrators(PEROUNDER		<u>→</u> ,
Permissions for HinesBBT estUsers	A <u>d</u> d	<u>R</u> emove
Read & execute List folder contents Read Write Special permissions		
Learn about access control and p	ermissions	
OK.	Cancel	

7) Select the **Sharing** tab and click **Advanced Sharing** (Figure 88).

Figure 88: VBECSReports Properties

📙 VBECSReports Properties 🛛 🗙
General Sharing Security Previous Versions Customize
Network File and Folder Sharing
VBLUSHeports Not Shared
Network Path: Not Shared
Share
Advanced Sharing
Set custom permissions, create multiple shares, and set other advanced sharing options.
🚱 Advanced Sharing
OK Cancel Apply

8) Click **Share this folder** and then **Permissions** (Figure 89).

Figure 89: Advanced Sharing

Advanced Sharing	×
Share this folder	
Settings	1
Share name:	
VBECSReports	
<u>A</u> dd <u>R</u> emove	
Limit the number of simultaneous users to: 167777	
Comments:	
Permissions Caching	
OK Cancel Apply	

9) Click Add (Figure 90).

Figure 90: Permissions

Permissions for VBECSReport	:5	×
Share Permissions		
<u>G</u> roup or user names:		
Everyone Everyone		
	A <u>d</u> d	<u>R</u> emove
Permissions for Everyone	Allow	Deny
Full Control Change Read		
Learn about access control and p	ermissions	
OK	Cancel	Apply

- 10) Specify the VBECS Users and VBECS Administrators group (Figure 91). Note that groups typically follow this naming convention (substitute the 3-letter site code for sss):
 - VBECS Users: VHAsssVbecsUsers
 - VBECS Administrators: *VHAsssVbecsAdministrators* Click **OK**.

Figure 91: Example of Select Users...

Select Users, Computers, Service Accounts, or Groups	? ×
Select this object type:	
Users, Service Accounts, or Groups	<u>O</u> bject Types
Erom this location:	
vha.med.va.gov	Locations
Enter the object names to select (examples):	
	<u>C</u> heck Names
Advanced OK	Cancel

11) Select the VBECS Administrators group and select **Full Control**. Leave the default permissions for the VBECS Users group and click **OK** (Figure 92).

Figure 92:	Permissions	for VBECSRep	orts
------------	-------------	--------------	------

Permissions for VBECSReport	ts	×
Share Permissions		
Group or user names:		
8 69 3		-
	A <u>d</u> d	<u>R</u> emove
<u>P</u> ermissions for V10CINVbecsAdministrators	Allow	Deny
Full Control		
Change		
	ormioniono	
ОК	Cancel	Apply

Workstation Tasks

Update the RDP shortcut and create a link to the report share on each lab workstation.

Update the RDP Shortcut

- 1) Log into the lab workstation with administrator privileges.
- 2) Right-click on the VBECs remote desktop shortcut and click Edit (Figure 93).

Figure 93: Edit shortcut



3) In the **Computer** field, the VBECS application server's fully qualified domain name. The name will always be your server name followed by **aac.dva.va.gov** (Figure 94). Click **Save**.

Figure 94: Remote Desktop Connection

nemote 🛙	Desktop Connection
N	Remote Desktop Connection
General D	isplay Local Resources Programs Experience Advanced
Logon sett	ings
	Enter the name of the remote computer.
	Computer: <server name="">.aac.dva.va.gov</server>
	Liber pame:
	User name.
	The remote computer name is not valid. Enter a valid remote computer name.
Connectio	n settings
	Save the current connection settings to an RDP file or open a
	Save Save As Open
Hide Opt	ions Co <u>n</u> nect <u>H</u> elp

Configure a Shortcut to the Report Share

The report share section (Configure the Report Share) must have been executed before proceeding with this section. The report share contains patient identifiable information, so the shortcut must only be accessible by authorized laboratory personnel. If the workstation will only be used by laboratory personnel, the shortcut may be placed in the **Public Desktop** folder. Otherwise, create it separately in each user's folder.

 Log into the lab workstation with administrator privileges. Navigate to the user's desktop folder (C:\Users\Public\Public Desktop), right-click on the **Desktop** folder and select **New**, **Shortcut** (Figure 95). Note: If you cannot see the Public Desktop folder in the tree view type C:\Users\Public\Public Desktop in the address bar and hit enter.

Figure 95: Example of New Shortcut



2) Enter the share name (\\<**VBECS application server fully qualified domain name** >**VBECSReports**) and click **Next** (Figure 96).

Figure 96: Example of Report Share

	×
Create shortcut	
What item would you like to create a shortcut for?	
This wizard helps you to create shortcuts to local or network programs, file Internet addresses.	es, folders, computers, or
<u>Iype the location of the item:</u>	
\\ <server name="">.aac.dva.va.gov\VBECSReports</server>	B <u>r</u> owse
Click Next to continue.	
	Next Cancel

3) Name the shortcut **VBECSReports**. Click **Finish** (Figure 97).

Figure 97: Create Shortcut

a Create Shortcut	
What would you like to name the shortcut?	
Iype a name for this shortcut:	
VBECSReports]
Click Finish to create the shortcut.	
	Finish Cancel

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Glossary

Acronym, Term	Definition
ABO	A group for classifying human blood, based on the presence or absence of specific antigens in the blood, which contains four blood types: A, B, AB, and O. The ABO group is the most critical of the human blood systems. It is used to determine general compatibility of donor units to a recipient.
Access Code	A field in the VistA New Person file used to uniquely identify a user on the VistA system.
Active Directory (AD)	A hierarchical directory service built on the Internet's Domain Naming System (DNS).
ADPAC	Automated Data Processing Application Coordinator.
AG	Availability Group.
ANR	Automated Notification Report.
API	Application Programmer Interface.
AITC	Austin Information Technology Center.
BCE	Bar Code Expansion.
CPRS	Computerized Patient Record System.
DBIA	Database Integration Agreement.
DR	Disaster Recovery.
DSS	Decision Support System.
DUZ	Designated User.
EO	Enterprise Operations.
FQDN	Fully Qualified Domain Name.
НА	High Availability.
HCPCS	Healthcare Common Procedure Coding System.
HL7	Health Level Seven.
LAN	Local Area Network.
LLP	Lower Layer Protocol.
LMIP	Laboratory Management Index Program.
PCE	Patient Care Encounter.
PIV	Personal Identification Verification.
RDP	Remote Desktop Protocol.
RPC	Remote Procedure Call.
SQL	Structured Query Language.
SSMS	SQL Server Management Studio.
SCOM	System Center Operations Manager.
TCP/IP	Transmission Control Protocol/Internet Protocol.
VAISS	VBECS Application Interfacing Support Software.

Acronym, Term	Definition
VBECS	VistA Blood Establishment Computer Software.
VDL	VA Software Document Library.
Verify Code	A field in the VistA New Person file used to verify the identity of a user associated with an Access Code.
VISN	Veterans Integrated Service Network.
XML	Extensible Markup Language.
Appendices

Appendix A: Instructions for Capturing Screen Shots

Throughout the technical manual-security guide, the Administrator is asked to capture screen shots to document configuration options. To capture a screen shot:

Open a blank document (for example, in Microsoft Word) and save it as (click File, Save As) • "mmddyy Technical-Security Validation Record," or another easily identified file name.

If you wish to place a document on the server for ease of copying and pasting, assign file names similar to "mmvvdd Technical-Security Validation Record Server1" and "mmvvdd Technical-Security Validation Record Server2."

When the screen you wish to capture is displayed, press the **Print Screen** key. In the Technical-Security Validation Record document, place the cursor where you want to insert the picture.

Click ⁽¹⁾ (the paste icon) or select Edit, Paste (Figure 98).

Figure 98: Paste

	Edit	View	Favorites	Tools	
в	Undo Delete		te Ctrl	+Z	
	Cut		Ctrl	+X	
re	Сору		Ctrl	+c \	
er	Paste		Ctrl	Ctrl+V	
	Pa	ste Shor	rtaut		

Label the screen shot within the document with the technical manual-security guide step, page number, and server on which the picture was taken.

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Appendix B: Data Center Instructions (Enterprise Operations only)

Purpose

This appendix describes the server configuration as well as the tasks that must be completed by the data center for a successful VBECS installation:

- Initial Setup Tasks: These tasks must be completed prior to installation of any VBECS systems. •
- Ongoing Tasks: These are continual maintenance tasks.

Server Configuration

The U.S. Food and Drug Administration classifies this software as a medical device. Unauthorized modifications will render this device an adulterated medical device under Section 501 of the Medical Device Amendments to the Federal Food, Drug, and Cosmetic Act. Acquiring and implementing this software through the Freedom of Information Act require the implementer to assume total responsibility for the software and become a registered manufacturer of a medical device, subject to FDA regulations.

WBECS is a medical device; all updates and changes to it must be tested and documented. This will be centrally managed. The VBECS servers must be added to site exclusion lists so they are not part of local update mechanisms. Ensure that login scripts do not run on VBECS servers as they may attempt to install unauthorized software. Do not install the ePolicy agent on the VBECS systems: exclude them from Systems Management Server (SMS) updates. Install Windows updates only after approval is granted.

App and Database Server Virtual Machine Configurations

Table 15 and Table 16 describe the configurations of the App and Database Server virtual machines respectively.

These configurations are designed to promote 24/7 availability and use of the application. At an App Server level, replication provides high availability. At the Database Server level, AlwaysOn cluster configuration provides near immediate failover in case the primary server fails.

Table 15: App Server Virtual Machine Configuration

App Server Specifications		
Processor	2 virtual CPUs (vCPUs) with a speed of 2.67GHz	
Memory	6 gigabyte (GB) main storage (RAM)	
Storage	80GB system drive (C) with a 10GB (D) drive to host configuration and reports	
Operating		
System	Microsoft Windows Server 2008 Server Enterprise Edition R2 (x64)	
Network		
Controller	Two 10/100 network cards; one for network configuration and another for backups.	
Backup	Servers are replicated at the disaster recovery site.	

Database Server Specifications		
Processor	4 vCPUs: Xeon(R) X5650 @ 2.67GHz	
Memory	32GB main storage (RAM)	
	Server: 80GB system drive (C)	
Storage	Shared storage: 4 x 980GB drives*: E (Data), F (Logs), G (TempDB) and H (Backup)	
Operating		
System	Microsoft Windows Server 2008 Server Enterprise Edition R2 (x64)	
Network		
Controller	Two 10/100 network cards; one for network configuration and another for backups.	
Backup	Data is replicated to the disaster recovery site via SQL AlwaysOn.	

*The drives used in the test servers will be scaled down.

Physical Host Configurations

Table 17 describes the requirements of the hosting hardware. Input/Output Operations per Second (IOPS) is a storage benchmark. The Storage Totals row describes the total amount of storage that each region must provide.

Table 17: App Server Virtual Machine Configuration

Specification		R01	R02	R03	R04
	Read (Avg/ Max)	654/ 5,265	658/ 5,326	985/ 7,959	646/ 5,143
IOPS	Write (Avg/ Max)	2,435/ 10,435	2,445/ 10,543	3,663/ 15,761	2,418/ 10,220
Storage Totals		31.16 TB	31.32 TB	46.9 TB	30.84 TB

Initial Setup Tasks

Execute the tasks in this section prior to installation.

Group Policy

For Group Policy purposes, VBECS servers will reside in their own OU, which will contain only VBECS servers. You may also create OUs under the main OU for organizational purposes. For more information, see the Group Policy section.

Import the *VHA VBECS Terminal Server Policy* from the VHAMASTER domain. Place the group policy in the top-level server OU. For more information about OUs and server organization, see the Active Directory section.

Configure the policy so that it is not applied to the RxxVbecsServerAdmins Active Directory group. See the example in Figure 99.

Advanced Security Settings for VHA VBECS Terminal Server Policy 🛛 🛛 🔀					
Permissions Owner Effective Permissions					
To view more information about Special permissions, select a permission entry, and then click Edit.					
Permission en <u>t</u> ries:					
Type Name	Permission 🔥				
Deny Enterprise Admins (VA\Enterprise Admins) Deny Domain Admins (VHAMASTER\Domain Admins)	Apply Group Policy Apply Group Policy				
Allow VBECSAdministrators (VHAMASTER/VBECSAdministrators) Allow VBECSAdministrators (VHAMASTER/VBECSAdministrators) Allow VBECSAdministrators (VHAMASTER/VBECSAdministrators) Allow Enterprise Admins (VA\Enterprise Admins) Allow Domain Admins (VHAMASTER\Domain Admins)	Special Special Special Special Special				
Allow ENTERPRISE DOMAIN CONTROLLERS	Special				
Add <u>E</u> dit <u>R</u> emove					
To replace all permission entries with the default settings, click Default.	Default				
ок (Cancel Apply				

Figure 99: Example of a Group Policy Not Applied to VBECSAdministrators Group

RDP Server

VBECS is a RDP Server application and requires a license. Specify the license server in the group policy at the following location:

• Computer Configuration, Policies, Administrative Templates, Windows Components, Remote Desktop Services, Remote Desktop Session Host, Licensing, Use the specified Remote Desktop license servers (Enabled), License servers to use: <specify the VA's license server with the server's fully qualified domain name>

Remote desktop is critical to VBECS. Failure to connect to a license server will result in widespread outages. If you see errors related to Terminal Server licensing, contact the Enterprise Engineering group immediately: VAITEngineeringCISIDM@va.gov.

Ongoing Tasks

Execute the tasks in this section continually.

1) Back Up the VBECS Database

Back up the VBECS databases nightly (1am CST):

- Back up all folders and files in the <Primary Server> H:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\Backup and <Secondary (HA) Server> H:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\Backup directories.
- Database backups are maintained for at least seven days on the Active Replica servers.

2) VBECS Updates

When the VBECS maintenance team releases a VBECS patch, install the patch in accordance with instructions supplied by the VBECS maintenance team.

3) Windows Updates

The VBECS maintenance team tests every Microsoft Windows update. Once the VBECS maintenance team certifies the Microsoft Windows update, EO staff at the AITC install the updates during the monthly maintenance periods defined for the test and production servers. Refer to *Applying Windows Updates* section for details.

Appendix C: Auditing on VBECS Servers

The following events are audited on VBECS servers. These events may be viewed in Event Viewer logs (under Administrative Tools):

- Account logon events (Success, Failure)
- Account management (Success, Failure)
- Directory service access (Success, Failure)
- Logon events (Success, Failure)
- Object access (Success, Failure)
- Policy Change (Success, Failure)
- System events (Success, Failure)

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