



RESOURCE AND PATIENT MANAGEMENT SYSTEM

# **Electronic Health Record**

(EHR)

## **EPCS Monitoring Service Technical Manual**

Version 1.1 Patch 25  
August 2019

Office of Information Technology  
Division of Information Technology

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## Document Revision History

Version	Date	Author	Description	Sections
1.0	9/2007	GDIT SESS team	Initial Release	All

## Preface

This guide provides information regarding technical aspects of the Indian Health Service (IHS) Electronic Prescribing of Controlled Substance (EPCS) Monitoring Service software. Its target audience is local and regional information technology support personnel who may be called upon to configure or troubleshoot the application.

This patch contains modifications required for EPCS. EPCS has been certified by the Drug Enforcement Administration (DEA) and in accordance with Title 21 CFR Subpart 1311 should not be modified without recertification.

## 1.0 Introduction

This manual provides IHS site managers with a technical description of the EHR-EPCS Monitoring Service routines, files, menus, cross references, globals, and other necessary information required to effectively manage the system. As this is component of the Electronic Health Record (EHR), all routines, files, options, and keys are namespaced starting with the letters “BEHO.”

The EPCS Monitoring Service is a Windows operating-system service that runs in the background and uses the BMXNet remote procedure call (RPC) broker to interact with the Resource and Patient Management System (RPMS). The service monitors the following:

- The revocation status of each cryptographic token certificate configured in the BEH EPCS CERTIFICATE STATUS file.
- The time synchronization offset of the RPMS server from National Institute of Standards and Technology (NIST) time servers.

Audit events are generated and captured in the IHS USER SECURITY AUDIT (BUSA) application when monitoring checks occur and when adverse results are returned. The service alerts individuals assigned to the BEHO EPCS INCIDENT RESPONSE mail group of any issues so that corrective actions can be initiated. All listed dependencies and technical details are delivered with patch EHR version 1.1 patch 25.

# 1.1 Architecture and Business Process Overview

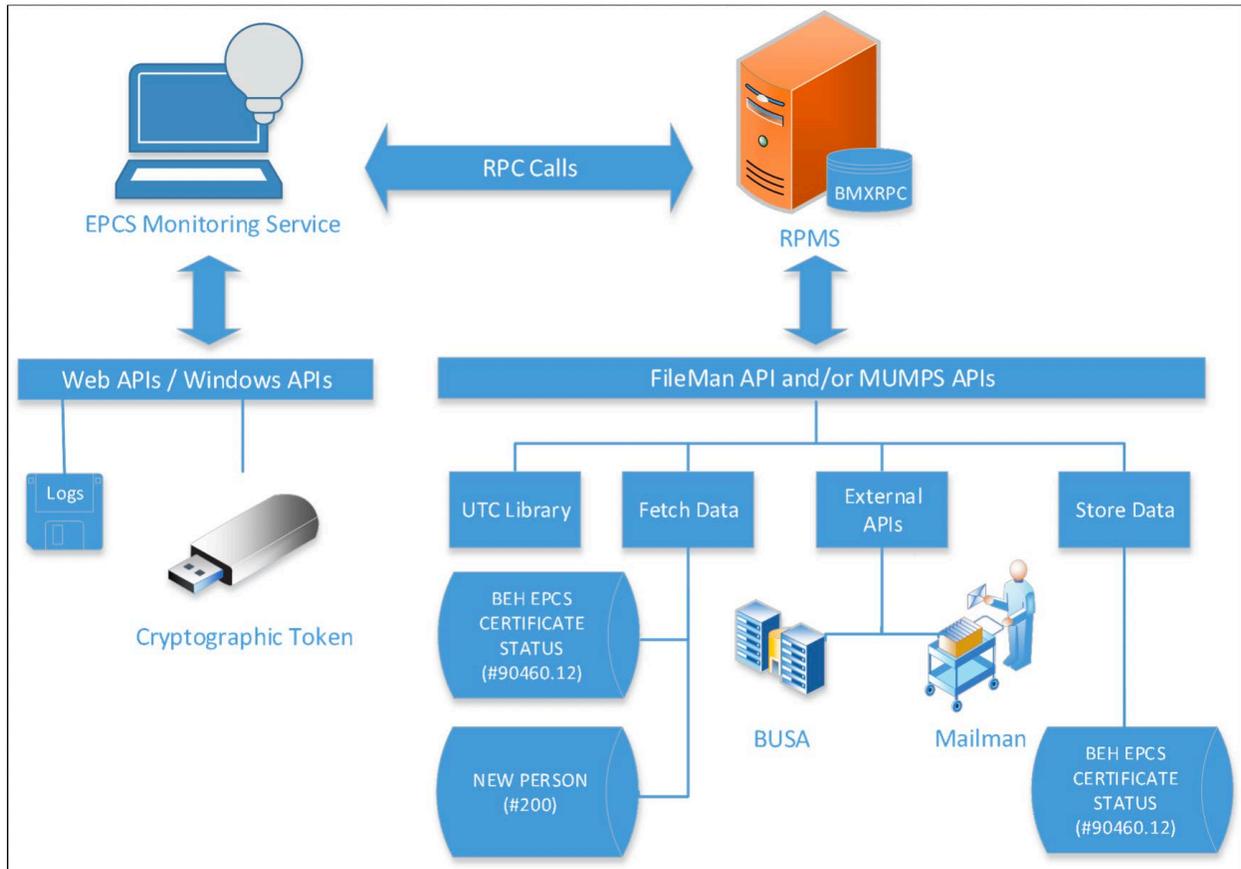


Figure 1-1: Overview of EPCS Monitoring Service

## 2.0 Implementation and Maintenance

### 2.1 General Information

This component has the following configuration:

Entity	Value
Product Name	BEH EPCS Monitoring Service
Service Name	BEHEPCSMon
Installer Name	ehr_0110.25_EPCSMon.Setup.msi
Product Code	{A915830D-3029-4175-AC37-91B14373D01C}
Upgrade Code	{96EF6B3B-2957-454A-9364-774448938005}
Startup Type	Automatic
Property Initializations	None
Required Files	Yes
Security Keys	None
Multiple Instances Allowed	No
Internal Property Editor	No
All Keys Required	No
Side-by-Side Versioning	No
Service	Yes
Windows Service	Yes
Associated Build	BEHO*1.1*071001
Product Description	Monitors EPCS Certificates, Time
Associated Build	BEHO*1.1*070001

In order for the EPCS Monitoring Service to complete its tasks, the server running the monitoring service will require internet access to initiate calls to the following:

- HTTP/HTTPS access to the Certificate Revocation List (CRL) of the Certificate Authority (CA) that issued the digital signing certificates.
- Network Time Protocol (NTP) access to time.nist.gov. The URL (universal resource locator) time.nist.gov is a global name that round-robins through the list of available NIST time servers. A list of the IP addresses that time.nist.gov may return can be found at <https://tf.nist.gov/tf-cgi/servers.cgi>.

Appropriate firewall/proxy rules will need to be established and maintained to allow these calls.

## 2.2 System Requirements

The EPCS Monitoring Service requires that BMXNet is set up and the BMX Listener is running. Please see the EPCS Configuration Guide for more details.

## 2.3 Package-wide Variables

There are no package-wide variables.

## 2.4 Security Keys

None.

### **3.0 EPCS Monitoring Service Menu**

The EPCS Monitoring Service has no menus or options.

## 4.0 Routine Descriptions

### 4.1 Routine List

BEHOEP6, BEHOEP7.

### 4.2 Routines with Description

<b>Routine</b>	<b>Description</b>
BEHOEP6	Supporting APIs for certificates validations and checks.
BEHOEP7	EPCS Certificates validations and checks.

## 5.0 Files and Tables

### 5.1 File List

File #	Filename	Description
90460.12	BEH EPCS CERTIFICATE STATUS	Holds the information required to validate a user's certificate used for digital signing.
90460.13	BEHO EPCS INCIDENT REPORT VARIABLES	Stores the Threshold variables used by the EPCS Incident Report and the Pharmacy Incident Report.
90460.14	BEH EPCS AUDIT LOG MESSAGES	Stores the list of audit events used by the EPCS Monitoring Service and Credentialing component of EHR.
90460.15	BEH EPCS CRL DISTRIBUTION POINTS	Stores the Certificate Revocation List (CRL) Distribution Point(s) used by the certificates stored in the BEH EPCS CERTIFICATE STATUS file.

### 5.2 File Access

File #	Filename	GL	RD	WR	LYG	DD	DEL
90460.12	BEH EPCS CERTIFICATE STATUS	@	@	@	@	@	@
90460.13	BEHO EPCS INCIDENT REPORT VARIABLES	@	@	@	@	@	@
90460.14	BEH EPCS AUDIT LOG MESSAGES	@	@	@	@	@	@
90460.15	BEH EPCS CRL DISTRIBUTION POINTS	@	@	@	@	@	@

### 5.3 Cross References

See Section 5.4 for a list of cross-references associated with each file.

### 5.4 Table File

#### 5.4.1 BEH EPCS CERTIFICATE STATUS (#90460.12)

Field Name	#	Datatype	Indexes	Description
SERIAL NUMBER	.01	Free Text	B – Standard	Unique serial Number that identifies the certificate

Field Name	#	Datatype	Indexes	Description
VERIFIED STATUS	.02	Set of Codes R: RETIRED, A: ACTIVE, P: PROPOSED		There can only be one active certificate per user at a time.
PROVIDER	.03	Pointer	C – Standard E – New (PROVIDER, VERIFIED STATUS)	Pointer to the NEW PERSON (#200) file
STATUS	.04	Set of Codes R: REVOKED, V: VALID		Revocation status of the certificate
LAST CHECKED DATE/TIME	.05	Date/Time		The date and time when the certificate was last checked by the EPCS Monitoring Service
EXPIRATION DATE	.06	Date/Time		Expiration Date stored on the certificate
SECURITY HASH	.07	Free Text		User to make sure a certificate is not tampered
CRL DISTRIBUTION POINT	1			Multiple field type (#90460.121)
PRIORITY	.01	Number	B – Standard	Priority order of CRL to use to check revocation.
CRL DISTRUBUTION POINT	.02	Pointer	D – Standard	Pointer to the BEH CRL DISTRIBUTION POINTS file (#90460.15)
USER PUBLIC CERT	2	Word Processing		

#### 5.4.2 BEH EPCS INCIDENT REPORT VARIABLES (#90460.13)

Field Name	#	Datatype	Indexes	Description
VARIABLE LONG NAME	.01	Free Text	B – Standard	Full variable name used for descriptions
VARIABLE SHORT NAME	.02	Free Text		Unique value used internally by the code
USER	.03	Pointer	C – Standard E – New (PROVIDER, VERIFIED STATUS)	Pointer to the NEW PERSON (#200) File. User who last updated the value

Field Name	#	Datatype	Indexes	Description
INCIDENT REPORT VARIABLE	.04	Set of Codes E: EPCS Daily Report, P: Pharmacy Daily Report		Indicate which report uses this value.
DEFAULT VALUE	.05	Numeric		Value sent and defaulted to by the application unless overridden by a site value
SITE VALUE	.06	Numeric		Override value sent by the site
SITE VALUE TYPE	.07	Set of Codes I: Count, P: Percentage		Type of value – used to help with display
DESCRIPTION	.08	Free Text		Description displayed to the user

### 5.4.3 BEH EPCS AUDIT LOG MESSAGES (#90460.14)

Field Name	#	Datatype	Indexes	Description
LOG ID	.01	Free Text	B – Standard	Assigned Log ID (i.e. EPCS31). Also, it saves as piece 7 of DESC parameter in the BUSA log.
AUDIT MESSAGE	1	Free Text		BUSA log and MailMan message text. Credentialing component, Two-Factor Authentication service and Monitoring Services are sending audit-related Identifiers and additional information in <INFO1>, <INFO2> and <INFO3>.
STATUS	2	Set of Codes S: SUCCESS F: FAILURE		Holds piece 3 for the DESC parameter of the BUSA log.
ACTION	3	Set of Codes A: AUDIT, M: MAILMAN, B: BOTH		Indicates if a MailMan message should be sent in addition to adding an entry into the BUSA log.
TYPE	4	Set of Codes S: Service PP: Provider Profile P: Pharmacy X: Prescribing E: EPCS		Holds piece 2 for the DESC parameter of the BUSA log.
EVENT	5	Set of Codes E: EPCS P: PHARMACY EP: BOTH		Holds piece 6 for the DESC parameter of the BUSA log.

Field Name	#	Datatype	Indexes	Description
MAIL GROUP	6	Pointer		Holds associated Mail Group – Pointer to the MAIL GROUP (#3.8) file
BUSA AUDIT TYPE	7	Free Text		Holds TYPE parameter of the BUSA audit log i.e. R: RPC Call W: Web Service A: API Call O: Other
BUSA AUDIT CATEGORY	8	Free Text		Holds CATEGORY parameter of the BUSA audit log, i.e., O: Other Event
BUSA AUDIT ACTION	9	Free Text		Holds ACTION parameter of the BUSA audit log, i.e.: A: Additions D: Deletions Q: Queries E: Changes C: Copy
BUSA AUDIT CALL	10	Free Text		Holds associated BUSA Group originated the audit.
MESSAGE DESCRIPTION	11	Free Text		Holds message description

#### 5.4.4 BEH EPCS CRL DISTRIBUTION POINTS (#90460.15)

Field Name	#	Datatype	Indexes	Description
CRL DISTRIBUTION POINT	.01	Free Text	B – Standard	Stores the CRL distribution point. Pointed to by the certificates in the BEH EPCS CERTIFICATE STATUS (#90460.12) file. Many-to-one relationship between the two files.

## 6.0 External Relations

The EPCS Monitoring Service uses the following external entities:

Entity	Name	Description
Library	%Library.UTC	Coordinated Universal Time
Broker	BMXNET40	Please see the EPCS Configuration Guide for more details.
Library	time.nist.gov	NIST Internet Time Servers.

### 6.1 Callable Routines

#### 6.1.1 \$\$CALCRSTH^BEHOEP6(Input)

Description: Calculate and generate certificate hash.

Input: Certificate Serial

Output: Hash (string)

#### 6.1.2 \$\$HASHSTR^BEHOEP6(Input)

Description: Returns SHA-256 Base64 Encode hash.

Input: Prescription Text

Output: Hash string

#### 6.1.3 \$\$GETCRL^BEHOEP6(Input)

Description: Retrieve CRL

Input: Certificate Serial

Output: CRL string

### 6.2 Remote Procedures

Name	Description
BEHOEP7 AUDITSVC	Log audit message
BEHOEP7 CERTSTAT	Update certificate status
BEHOEP7 LISTCERT	Returns array of certificates on the system
BEHOEP7 UTC	Returns local time in UTC format

### 6.2.1 BEHOEP7 AUDITSVC

Scope: Private

Parameter	Datatype	Description
LogID	String	LOG ID from 90460.14
P1	String	Additional information for the log message
P2	String	Additional information for the log message
P3	String	Additional information for the log message
<return value>	String	Returns a 1 for successful Log/Mailman or 0^Message otherwise

### 6.2.2 BEHOEP7 CERTSTAT

Scope: Private

Parameter	Datatype	Description
SERIAL	String	Serial Number
STATUS	String	R: Revoked, V: Valid
<return value>	String	Updates the Certificate Status in BEH EPCS CERTIFICATE STATUS (90460.12). Returns a 1 or 0^Message for success/failure.

### 6.2.3 BEHOEP7 LISTCERT

Scope: Private

Parameter	Datatype	Description
<return value>	Array	Return an array of active certificates on the system in the format: Serial Number^CRL Value (*28 delimited)

### 6.2.4 BEHOEP7 UTC

Scope: Private

Parameter	Datatype	Description
<return value>	String	Returns local server time in UTC format.

## 6.3 Published Entry Points

There are no published Entry Points.

## 6.4 Exported Options

None.

## **7.0 Internal Relations**

There are no internal relations.

## **8.0 Archiving and Purging**

There are no archiving or purging requirements within this software.

## 9.0 Mail Groups

Name	Description
BEHO EPCS INCIDENT RESPONSE	Mail group that receives time slip alert messages

## 10.0 Documentation Resources

This section describes a few methods to generate online technical documentation.

### System Documentation

Online VPS system documentation can be generated through the use of several Kernel options, including, but not limited to:

- %INDEX
- VA FileMan
- Data Dictionary Utilities
- List File Attributes

For more option listings and further information about other utilities that supply online technical information, see the Decentralized Hospital Computer Program (DHCP) Kernel Reference manual.

### 10.1 %INDEX

The %INDEX option analyzes the structure of a routine to determine in part, if the routine adheres to RPMS programming standards. The output can include the following components:

- Compiled list of errors and warnings
- Routine listing
- Local variables
- Global variables
- Naked globals
- Label references
- External references

Running %INDEX for a specified set of routines allows users to discover any deviations from RPMS programming standards that exist, and to see how routines interact with one another (i.e., which routines call or are called by other routines). To run %INDEX for the VPS system. At the “Routine(s)?” prompt, type the BEHO namespace.

## 10.2 List File Attributes

This VA FileMan option allows users to generate documentation pertaining to files and file structure. The standard format of this option provides the following data dictionary information for a specified file:

- File name and description
- Identifiers
- Cross-references
- Files pointed to by the file specified
- Files that point to the file specified
- Input, print, and sort templates

In addition, the following applicable data is supplied for each field in the file:

- Field name, number, title, and description
- Global location
- Help prompt
- Cross-references
- Input transform
- Date last edited
- Notes

Using the Global Map format of this option generates an output that lists the following information:

- All cross-references for the file selected
- Global location of each field in the file
- Input, print, and sort templates

For a comprehensive listing of EHR-EPCS Monitoring Service files, see Section 5.0.

## **11.0 SAC Requirements and Exemptions**

The EPCS Monitoring Service has no SAC Exemptions.

## Glossary

### **CRL Distribution Point**

A Certificate Revocation List (CRL) Distribution Point is a location where a Certificate Authority (CA) publishes the list of certificates it issued that have been revoked.

### **Expired (Certificates)**

An Expired certificate means the certificate can no longer be used for its intended purpose, such as digital signing. The certificate can still be used to validate signatures that were created before the certificate expired.

### **Revoked (Certificates)**

A revoked certificate means the certificate has not expired, but can no longer be used for its intended purpose, such as digital signing. Whether a revoked certificate can be used to validate signatures that were created before the revocation depends on the reason for revocation. As an example, a certificate that was revoked because it is no longer needed could still be used to validate digital signatures. A certificate that was revoked because it was compromised could not.

### **Remote Procedure Call**

The act of invoking a remote procedure. This is often used interchangeably with the term “Remote Procedure,” especially using its abbreviated form “RPC.”

## Acronym List

Acronym	Meaning
API	Application Programming Interface
CA	Certificate Authority
CDP	Certificate Revocation List Distribution Point
CRL	Certificate Revocation List
DEA	Drug Enforcement Administration
EHR	Electronic Health Record
EPCS	Electronic Prescribing of Controlled Substance
HTTP	Hyper Text Transport Protocol
HTTPS	Secure Hyper Text Transport Protocol
IHS	Indian Health Service
IP	Internet Protocol
NIST	National Institute of Standards and Technology
NTP	Network Time Protocol
RPC	Remote Procedure Call
RPMS	Resource and Patient Management System
URL	Universal Resource Locator
UTC	Coordinated Universal Time

## Contact Information

If you have any questions or comments regarding this distribution, please contact the OIT Help Desk (IHS).

**Phone:** (888) 830-7280 (toll free)

**Web:** <http://www.ihs.gov/helpdesk/>

**Email:** [support@ihs.gov](mailto:support@ihs.gov)