

Prescription Monitoring Program Information Exchange *RxCheck State Routing Service*

SRS Installation & Setup Guide for PDMP

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Introduction

Overview

The PMIX service provides state PMP systems with the capability to retrieve interstate prescription drug history and display it to their in-state end users (requestor) to assist in the identification of potential abuse and diversion. The service can provide the requested drug history as a direct response to a request containing person identifiers. Multiple requests can be issued in sequence by a state PMP system to provide prescription drug histories from as many states as needed.

Specifications

PMIX Architecture

The Prescription Drug Monitoring Program Training and Technical Assistance Center (PDMP TTAC) and other stakeholders have undertaken the development of a consensus, national PMIX Architecture to enable the interstate sharing of PMP data. The use of open, consensus standards promotes interoperability. The National Information Exchange Model (NIEM) and the Global Reference Architecture (GRA) are foundational standards of the PMIX Architecture.

The PMIX architecture requires

- 1. Common NIEM exchange data and metadata,
- 2. Hub connections and
- 3. End-to-end security (including encryption key management).

The architecture will result in a shared infrastructure to support certificate/key management capabilities and basic directory services, specifically the PMIX Directory Service. The PMIX Directory, also known as the PMIX PKI Server, provided for X.509 certificate management and public key exchange as well as PMP contact and service requirement information.



Figure 1: PMIX Overview

RxCheck / SRS Connection

The PMIX service interface utilizes standards-based web services to facilitate communication through hubs to the endpoint systems. The following diagram shows a state PDMP system connecting to the PMIX RxCheck Hub via the PMIX State Routing Service (SRS). The PMIX SRS enables PDMPs to "offload" PMIX functionality such as PMIX compliant service hosting, request/response message validation, role-based site authorization, full message routing and message translation.



Figure 2: PMIX RxCheck/SRS Architecture Detail

The web service interfaces are protected by a combination of secure socket layer, which provides transport level encryption and service authentication and message level encryption, which ensures message privacy and integrity. The PMIX SRS handles all X.509 certificate-based message encryption/decryption involved in communicating over the PMIX secure web service interface.

Installation Procedure

The steps listed below are intended to provide PDMP technical staff with general guidance to which serves to augment the information contained in the PMIX SSP documentation. Please note that implementation may vary depending upon a PDMP's computer system. The IJIS Institute is available to provide technical assistance as needed.

Step 1: Download Package and Prepare the pre-installation checklist

- Download the following files from http://builds.rxcheck.org/SRS/v3.0/public_final/ Windows: rxcheck-srs-pdmp-3.0-b
 Linux: <a href="mailto:rxcheck-srs-pdmp-3.0-b
 Linux: <a href="mailto:rxcheck-srs-pdmp-3.0-b
- Download and Install JDK from AdoptOpenJDK (Linux Only) <u>https://adoptopenjdk.net/</u>

Add following environment variables to the account .profile :

export JAVA_HOME=/opt/jdk-11.0.6+10 export PATH=\$JAVA_HOME/bin

• Fill out and prepare the pre-installation checklist defined in Appendix A

Step 2: Network Preparation

- Configure and validate network connectivity between the State Routing Service and the two endpoint systems:
 - "External" RxCheck Central Hub
 - "Internal" PDMP System
- The following steps, which are based on a typical configuration process, reflect general network configuration guidance and may need to be tailored to apply to specific environments.
 - Network Access
 - Enable the SRS to access the RxCheck Hub
 - Provide the PMIX RxCheck Administrator with the SRS external IP address, so they can configure the IJIS network firewall
 - Configure the networking components:
 - Add the necessary network address translation (NAT)
 - \circ $\;$ Add the routing rules needed to route outbound traffic $\;$
 - If necessary, add any outbound firewall rules

- If the external IP address is "virtual", ensure any added routing provisions are implemented
- Enable the SRS to access the State PDMP
 - Configure the networking components:
 - Add the necessary network address translation (NAT)
 - Add the routing rules needed to route outbound traffic
 - If necessary, add any outbound firewall rules
 - If the external IP address is "virtual", ensure any added routing provisions are implemented
- Enable the RxCheck Hub to access the SRS
 - Provide the PMIX RxCheck Administrator with the SRS externally accessible IP address used to connect to the listener
 - Configure the networking components:
 - Add the necessary inbound firewall rules
 - If the external IP address is "virtual", ensure any added routing provisions are implemented

• Domain Name Resolution

- RxCheck Hub
 - Identity the domain name and network address
 - Ensure the SRS is able to resolve the domain name to the IP
- State PMP System
 - Identity the domain name and network address
 - Ensure the SRS is able to resolve the domain name to the IP

Step 3: Security

The following outline provides instructions (Windows Server) to help acquire and install the X.509 certificate for the PMIX SRS:

- Generate SSL/TLS Custom CSR self-signed certificate (if necessary)
 - Open Microsoft Powershell Window (in Administrator mode)
 - Create the certificate using the following command that will be placed under the local machine and export the PFX and CER version of the certificate to be used in the installer

Create Self-Signed Certificate

 $\label{eq:PS} PS > New-SelfSignedCertificate -Subject "CN=_SITEID_" -KeyLength 2048 -NotBefore (Get-Date) -NotAfter (Get-Date) -AddMonths(36) -CertStoreLocation "cert:\LocalMachine\My"$

<pre>PS C:\WINDOWS\system32> New-SelfSignedCer n "cert:\LocalMachine\My"</pre>	tificate -Subject "CN=1	(K" -KeyLength 2048	-NotBefore (Get-Date)	-NotAfter (Get-Date).A	ddMonths(36) -CertStoreLocatio
PSParentPath: Microsoft.PowerShell.Sec	urity\Certificate::Loca	lMachine∖My			
Thumbprint	Subject				
8F8747235C7EFF84E04410D5ED1AB18F21C5556D	CN=KK				

Note: Copy the certificate Thumbprint to be used in the following steps.

Export the Private Key of the Certificate in PFX format

 $\mathsf{PS} > \$\mathsf{mypwd} = \mathsf{ConvertTo-SecureString} \ \texttt{-String} \ \texttt{"password"} \ \texttt{-Force} \ \texttt{-AsPlainText}$

 $\label{eq:ps_section} PS > Get-ChildItem \mbox{-Path cert:} localMachine\my[CERTIFICATE-THUMBPRINT] | Export-PfxCertificate \mbox{-FilePath e:} e:\temp_SITEID_.pfx \mbox{-Password $mypwd} \\$

PS				ng "kkpass" -Force -AsPlainText Ne\my\8F8747235C7EFF84E04410D5ED1AE	318F21C5556D Export-PfxCert	tificate -FilePath e:\temp\KK.pfx -P
	Directory: E:\temp					
Mod	de La	stWriteTime	Length Name			
- a -	7/12/201	.8 6:29 PM	2589 KK.pfx			

Export the Public Key of the Certificate in DER format

PS > Get-ChildItem -Path cert:\localMachine\my\[CERTIFICATE-THUMBPRINT] | Export-Certificate -Type CERT -FilePath



Step 4: Install Application

Install RxCheck SRS Package

• Unzip *rxcheck-srs-pdmp-3.0-b<build number>.zip* file to a folder.

Windows:

→ * ↑ 🧧 « Windows	s-SSD (C:) > RxCheck > rxcheck-sr	s-pdmp-3.0-b139 🗸 🗸	ර් 🔎 Search	rxcheck-srs-pdmp-3
	Name	Date modified	Туре	Size
🖈 Quick access	bin	1/21/2021 1:08 PM	File folder	
SoneDrive - tetruscorp.cc	conf	1/21/2021 1:08 PM	File folder	
This PC	jre 🛛	1/21/2021 1:08 PM	File folder	
a desta sub-stati inte	📙 lib	1/21/2021 1:08 PM	File folder	
3D Objects		12/7/2019 4:42 PM	File folder	
Nesktop	temp	12/7/2019 4:43 PM	File folder	
Documents	🔜 webapps	1/21/2021 1:08 PM	File folder	
🕹 Downloads	work	12/7/2019 4:42 PM	File folder	
👌 Music	BUILDING.txt	1/21/2021 1:08 PM	Text Document	20 KB
Pictures	CONTRIBUTING.md	1/21/2021 1:08 PM	MD File	6 KB
Videos	LICENSE	1/21/2021 1:08 PM	File	57 KB
Windows-SSD (C:)	NOTICE	1/21/2021 1:08 PM	File	3 KB
	README.md	1/21/2021 1:08 PM	MD File	4 KB
🕳 Google Drive File Strea	RELEASE-NOTES	1/21/2021 1:08 PM	File	7 KB
Network	RUNNING.txt	1/21/2021 1:08 PM	Text Document	17 KB

Linux:

\$ unzip rxcheck-srs-pdmp-3.0-b
build number>-linux.zip

• Open command prompt and change directory to "bin" folder

Windows:

c:\> cd c:\rxcheck\ rxcheck-srs-pdmp-3.0-b<build number>\bin

<u>Linux:</u>

\$cd /home/rxcheck/ rxcheck-srs-pdmp-3.0-b
build number>/bin

\$chmod +x *.sh

Install RxCheck SRS 3.0 as Windows Service by executing below command. (Windows Only)

Windows:

c:\rxcheck\ rxcheck-srs-pdmp-3.0-b<build number>\bin>service.bat install "RxCheckSRS_3.0"



Configure RxCheck SRS

• Change the folder to "conf" folder

Windows:

c:\>cd c:\rxcheck\rxcheck-srs-pdmp-3.0-b<build number>\conf

<u>Linux:</u>

\$cd /home/rxcheck/rxcheck-srs-pdmp-3.0-b
build number>-linux/conf

• Rename application.yml.template.XXX file to application.yml file

Note: Use *application.yml.template.dev* for beta release

• Edit *application.yml* using an editor like Notepad++ or VI and replace the variables with values listed in the table.

Variable Name	Description
APIKEY	API Key provided by RxCheck
SITEID	Site Id provided by RxCheck
_FULLPATH_KEYSTORE_FILE_	Full path to PFX certificate file containing the Private Key that was
	created in Step 3 of the installation.
KEYPASSWORD	Password for KeyEntry (entered in Step 3)
STOREPASSWORD	Password for the KeyStore (default is the same password as key
	password, entered in Step 3)

Step 5: Complete SRS Configuration on the RxCheck Console

Console URL : <u>https://dev.rxcheck.org/rxconsole</u>

• Login to RxCheck Console using the credentials provided.

RxCh	eck
Welcome RxConso	То
Username	
Password	
Sign In	
Forgot Passw	lord

• Setup SRS Outbound Sender Endpoint Security

	FHIR URL Path		
	/rxoutbound/fhir		
,	FHIR Outbound URL*		
	http://localhost:8080/rxoutbound/fhir		
	Ē		
	HTML URL Path*		
	/rxoutbound/report/html		
	HTML Outbound URL-		
	http://localhost:8080/rxoutbound/report/html		
	Security Credentials : (HTTP Basic Authentication)		
	Outbound Username	Outbound Password	
	Outbound Username	Outbound Password	

Set the username and password to secure the endpoints. Leave the fields blank if HTTP Basic Authentication is not required.

Field Name	Description	Default Value
Outbound	HTTP Basic Access Authentication Username	
Username		
Outbound	HTTP Basic Access Authentication Password	
Password		

• Setup SRS Inbound Sender Endpoint

Protocol*	Domain	
HTTPS	✓ localhost	
Port Number*	IP Address*	
26283	10.1.0.8	
nbound URL*	IEPD*	
https://localhost:26283/rxinbound/service/inbound	PMIX1	
Rate Limiting Rate Limit	Time Unit	
0	Select Time Unit	
Enable Loopback (Same Site Oubound can call same site Inbound) Enable Loopback		
	Inbound Password	

Enter the SRS inbound configuration details for the RxCheck hub to connect to the Inbound SRS service

Field Name	Description	Default Value
Protocol	Select http or https	https

Domain	Enter a domain name for the SRS Inbound Service instance (Optional – If no domain is specified the system would use the IP Address)	
Port Number	Enter the port number for the SRS inbound service instance (This would be the external port number if there is a firewall NAT)	8443
IP Address	IP address of the server or the external gateway IP address for the SRS inbound Service instance	
IEPD	Select the PMIX version	PMIX2
Inbound URL	The inbound SRS secure URL	https:///rxinbound/service/pmix2
Inbound Username	HTTP Basic Access Authentication Username	
Inbound Password	HTTP Basic Access Authentication Password	

• Setup PDMP Application Endpoint

- 5 Site PDMP Application Endpoint			
Protocol+	Domain		
HTTP	✓ Domain Name		
Port Number*	IP Address*		
9085	192.168.168.80	192.168.168.80	
URL Path*			
/rxcheck/pdmp			
PDMP URL*			
http://192.168.168.80:9085/rxcheck/pdmp			
a Security Credentials : (HTTP Basic Authentication)			
PDMP Username	PDMP Password		
PDMP Username	****	•	

Field Name	Description	Default Value
Protocol	Select http or https	
Domain	Enter a domain name for the PDMP Service instance (Optional –	
	If no domain is specified the system would use the IP Address)	
Port Number	Enter the port number for PDMP service instance	
IP Address	IP address of the server of the PDMP service instance	
URL Path	This is the relative path of the application URL suffix	
PDMP	HTTP Basic Access Authentication Username	
Username		
PDMP	HTTP Basic Access Authentication Password	
Password		

• Upload SRS Public Key to RxCheck Console PKI database

– 6 SRS Certificate			
Private Key Subject			
Public key (Cer format) 🚯			
Public key (Cer format) () Choose File No file chosen			

• Enter Subject name used in Step 3 in the *Private Key Subject* field. Eg: TT

General	Details	Certification Path	1	
Show:	<all></all>		~	
Field			Value	^
Sig	Signature algorithm		sha 1RSA	_
Sig	Signature hash algorithm		sha1	
Iss	Issuer		π	
Va	Valid from		Saturday, January 20, 2018 1	
6 Va	lid to		Saturday, December 31, 2022	
In Su	bject		Π	1
	Public key			
Contract of the local division of the local	blic key		RSA (4096 Bits)	

- \circ Upload the public key. The certificate must be in DER encoded binary X.509 (.cer) format.
- Click "Save" button on the Site Configurations page.

Step 6: Starting RxCheck SRS 3.0

 Open Windows Services Manager. To open Windows Services, Run *services.msc* to open the Services Manager. Here you will be able to start, stop, disable, delay Windows Services. (Windows Only)

Services					- 0
ile Action View	Help				
⊨ => 📅 🖾 🦉	G 🔒 🛛 📷 🕨 🔳 🛛	IÞ.			
Services (Local)	O Services (Local)				
	RxCheckSRS_3.0b	Name	Description	Status	Startup Type
	Start the service	Remote Desktop Services Remote Desktop Services U	Allows users to connect interactively to a remote computer. Remote De Allows the redirection of Printers/Drives/Ports for RDP connections		Manual Manual
	Description: RxCheck SRS 3.0	Remote Procedure Call (RP Remote Registry Retail Demo Service	The RPSSS service is the Service Control Manager for COM and DCOM s In Windows 2003 and earlier versions of Windows, the Remote Procedur Enables: remote users to modify registry settings on this computer. If thi The Retail Demo service controls device activity while the device is in ret	Kunning	Automatic Manual Disabled Manual
		Routing and Remote Access RPC Endpoint Mapper RcCheckSRS_3.0b	Offers routing services to businesses in local area and wide area network Resolves RPC interfaces identifiers to transport endpoints. If this service RxCheck SRS 3.0	Running	Disabled Automatic Manual
		Secondary Logon Security Accounts Manager Security Accounts Manager Security Accounts Manager Security Center Sensor Manitoring Service Sensor Monitoring Service Sensor Service Server	Enables starting processes under alternate credentials. If this service is st Provides support for the Secure Socket Tunneling Protocol (SSTP) to co The startup of this service signals other services that the Security Accou The VISCSVC (Vindows Security Certer) service monitors and reports se Delivers data from a variety of servos Monitors various sensors in order to espose data and adapt to system a A service for sensors that manages different sensors' functionality, Man Supports file print, and named-pipe sharing over the network for this c	Running Running Running Running Running Running	Manual Automatic Automatic (Delayed Start) Manual (Trigger Start) Manual (Trigger Start) Manual (Trigger Start) Automatic (Trigger Start)
		Shared PC Account Manager Shell Hardware Detection Smart Card Smart Card Smart Card Device Enumera <	Manages profiles and accounts on a SharedP Configured device Provides notifications for AutoPlay hardware events. Manages access to smart cards read by this computer. If this service is st Creates software device nodes for all smart card readers accessible to a	Running	Disabled Automatic Manual (Trigger Start) Manual (Trigger Start)
	Extended Standard				

• Find Service "*RxCheckSRS_3.0b*" and change the Start Type to "Automatic" (Windows Only)

Log Un	Recovery	Dependence	ies	
name:	RxCheck S	RS_3.0b		
name:	RxCheck S	RS_3.0b		
tion:	RxCheck SRS 3.0			<
	100 Va. 1	р-3.0-b139\b	in∖Tomcat9.e	xe //RS//RxCheck
type:	Manual 🗸			
	Automatic (Delayed Start)			
status:	Manual Disabled Stopped			
itart	Stop	1	Pause	Resume
n specify t re.	he start para	meters that a	pply when you	u start the service
rameters:				
	name: name: tion: executabl heck \xxch type: status: tart tart re.	name: RxCheckS name: RxCheckS tion: RxCheckS texecutable: neck\vxcheck-srs-pdm type: Manual Automatic Automatic Manual Disabled status: Stopped tart Stop	name: RxCheckSRS_3.0b name: RxCheckSRS_3.0b tion: RxCheckSRS_3.0b tion: RxCheckSRS_3.0 executable: neck\vxcheck-srs-pdmp-3.0-b139\b type: Manual Automatic (Delayed Sta Automatic Delayed Sta Automatic Delayed Sta Automatic Stopped tart Stop	name: RxCheckSRS_3.0b name: RxCheckSRS_3.0b tion: RxCheckSRS_3.0b tion: RxCheckSRS_3.0 executable: neck\vxcheck-srs-pdmp-3.0-b139\bin\Tomcat9.e type: Manual Automatic (Delayed Start) Automatic Manual Disabled status: Stopped tart Stop Pause n specify the start parameters that apply when you re.

- Right click on the service name and "Start" the service. (Windows Only)
- Run the *startup.sh* from *bin* folder to start the SRS process (Linux Only)
- Open the following Service URLs in a browser to verify the services are running

PMIX Inbound	https://localhost:8443/rxinbound/service/pmix2?wsdl
SRS	
PMIX Outbound	http://localhost:8080/rxoutbound/service/pmix2?wsdl
SRS	

 $\underline{\textbf{Note:}} \ \textbf{Replace localhost with the machine name or DNS name associated with the SRS server}$

Step 7: Conduct Simulator Testing

• Perform a simulator test in which an State PDMP sends a message to the simulator with state code "GG" and the simulator can respond back with a message.

Step 8: Integration Testing

• Perform integration testing with an exchange partner; the request will flow from the requestingstate PDMP application to the requesting-state SRS (Option 1) *or* the Custom Proxy (Option 2), to the RxCheck Hub, to the disclosing-state PDMP application (note: the response will follow the same steps in the reverse direction)

Appendix A:

Pre-Installation Checklist

The following architecture diagram and pre-installation checklist table will orient the deployment team by identifying important system information prior to the software installation and configuration.



Figure 3: PMIX RxCheck/SRS Architecture Detail

ID	Description	Value		
1.	SRS Outbound Host Base URL Address	http://:8080/rxoutbound/service/pmix2		
1.1	Domain Name:			
1.2	IP Address:			
2.	RxCheck Hub Service Host URL Address	https://test.rxcheck.org:18803/RxCheck/hub		
2.1	Domain Name:	test.rxcheck.org		
2.2	IP Address:	13.90.244.183		
3.	SRS Inbound Host Base URL Address	https://:8443/rxinbound/service/pmix2		
3.1	Domain Name:			
3.2	IP Address:			
4.	New site PDMP Application URL Address			
4.1	Domain Name:			
4.2	IP Address:			
5.	New site unique qualifier (NW)			
6.	Exchange partner unique qualifier (EP)			
Α.	The new site's PMIX SRS certificate			
В.	The partner site's PMIX SRS certificate			
#	Network Configuration (Firewall, Router)			

Table 1: Pre-Installation Checklist (UAT)

ID	Description	Value
1.	SRS Outbound Host Base URL Address	http://:8080/rxoutbound/service/pmix2
1.1	Domain Name:	
1.2	IP Address:	
2.	RxCheck Hub Service Host URL Address	https://prod.rxcheck.org:18803/rxcheck/pmix2
2.1	Domain Name:	prod.rxcheck.org
2.2	IP Address:	52.227.138.130
3.	SRS Inbound Host Base URL Address	https://:8443/rxinbound/service/pmix2
3.1	Domain Name:	
3.2	IP Address:	
4.	New site PDMP Application URL Address	
4.1	Domain Name:	
4.2	IP Address:	
5.	New site unique qualifier (NW)	
6.	Exchange partner unique qualifier (EP)	
Α.	The new site's PMIX SRS certificate	
В.	The partner site's PMIX SRS certificate	
#	Network Configuration (Firewall, Router)	

Table 2: Pre-Installation Checklist (PROD)

Appendix B

Customizing SRS

1. Changing Server Ports

By default, the RxCheck SRS service runs on ports 8080 (http) and 8433 (https). If necessary, different ports can be configured in server.xml file located in c:\rxcheck\apache-tomcat-8.5.32\conf folder.

For HTTP port, modify the below XML element. Change the port 8080 to a desired port.

<Connector port="8080" protocol="HTTP/1.1" connectionTimeout="20000" redirectPort="8443" />

• For HTTPS port, modify the below XML elements. Change the port 8443 to a desired port.

<Connector port="8080" protocol="HTTP/1.1" connectionTimeout="20000" redirectPort="8443" />

<Connector SSLEnabled="true" clientAuth="false" keystoreFile="conf/keystore.jks" keystorePass="rxchecksrs" maxThreads="150" port="8443" protocol="HTTP/1.1" scheme="https" secure="true" sslProtocol="TLS"/>

<Connector port="8009" protocol="AJP/1.3" redirectPort="8443" />

2. Changing Server Certificate

A default self-signed certificate is included in the package for SSL/TLS transport layer. This must be replaced by either a new self-signed certificate or a certificate purchased from a CA in production environment.

• Creating a self-signed certificate.

C\>keytool -genkey -keyalg RSA -alias selfsigned -keystore keystore.jks -storepass rxchecksrs -validity 720 -keysize 2048

• Copy the self-signed certificate keystore keystore.jks file to c:\rxcheck\apache-tomcat-8.5.32\conf folder

3. Separate instances for Outbound and Inbound Services

If desired, separate instances of Outbound and Inbound SRS's can be installed on the same server or on a different sever by following the steps 1 through 6. This might be required due to the local network security requirements or for achieving higher performance throughput.

Based on the type of service you are installing, delete the other .war file from c:\rxcheck\apachetomcat-8.5.32\webapps folder.

4. Increasing JVM memory

By default, the Java process heap size is set for minimum 3072MB and maximum 6144MB. This must be changed to higher memory for production environment.

Memory parameters can be changed in service.bat file located in c:\rxcheck\ rxcheck-srs-pdmp-3.0\bin. You may need to uninstall and reinstall the service.

```
if "%JvmMs%" == "" set JvmMs=<u>3072</u>
```

if "%JvmMx%" == "" set JvmMx=<u>6144</u>

5. Uninstalling RxCheck SRS

To uninstall SRS process, execute command.

c:\rxcheck\rxcheck-srs-pdmp-3.0\bin>service.bat uninstall "RxCheckSRS_3.0b"

