Privileged Account Manager 3.7 System Requirements

November 2019

Micro Focus recommends the tested platforms listed below. However, customers running on any platforms not provided in this list or with untested configurations will be supported until the point Micro Focus determines that the root cause is the untested platform or configuration.

Issues that can be reproduced on the tested platforms will be prioritized and fixed according to standard defect-handling policies.

For more information about support polices, see Support Policies.

For more information about installation, see the Privileged Account Manager Installation Guide.

1 Product Requirements

1.1 Software Requirements

1.1.1 Operating Systems

Component	Runs on
Framework Manager	◆ Microsoft Windows Server 2019 (64-bit)
	◆ Microsoft Windows Server 2016 (64-bit)
	◆ Microsoft Windows Server 2012 R2 (64-bit)
	◆ Microsoft Windows Server 2008 R2 (64-bit)
	◆ SUSE Linux Enterprise Server (SLES) 15 SP1 (64-bit)
	◆ SUSE Linux Enterprise Server (SLES) 12 SP4 (64-bit)
	◆ SUSE Linux Enterprise Server (SLES) 11 SP4 (64-bit)
	◆ Red Hat Enterprise Linux Server (RHEL) 8 (64-bit)
	◆ Red Hat Enterprise Linux Server (RHEL) 7.6 (64-bit)
	◆ Red Hat Enterprise Linux Server (RHEL) RHEL 6.10 (64 bit)
	◆ Oracle Linux 7 (64-bit)

Component	Runs on
Agent	**Servers:** ◆ Microsoft Windows 10 (64-bit) ◆ Microsoft Windows 7 (32-bit) ◆ Microsoft Windows Server 2019 ◆ Microsoft Windows Server 2016 ◆ Microsoft Windows Server 2012 R2 (64-bit) ◆ Microsoft Windows Server 2008 R2 (64-bit) ◆ SUSE Linux Enterprise Server (SLES) 15 SP1 (64-bit) ◆ SUSE Linux Enterprise Server (SLES) 12 (64-bit) ◆ SUSE Linux Enterprise Server (SLES) 11 (32-bit and 64-bit) ◆ Red Hat Enterprise Linux Server (RHEL) 8 (64-bit) ◆ Red Hat Enterprise Linux Server (RHEL) 7.x (64-bit) ◆ Red Hat Enterprise Linux Server (RHEL) 6.x (32-bit and 64-bit) ◆ AIX 7.1 (64-bit) ◆ AIX 6.1 (32-bit and 64-bit) ◆ Solaris (SPARC) (32-bit and 64-bit) on version 11 ◆ Solaris (Intel) (64-bit) on version 11 ◆ Solaris (SPARC) (32-bit and 64-bit) on version 10 ◆ Solaris (Intel) (32-bit and 64-bit) on version 10 ◆ Oracle Linux 8 (64-bit) ◆ Oracle Linux 7 (64-bit) ◆ HP-UX (Itanium) 11.31 (64-bit) ◆ HP-UX (Itanium) 11.23 (64-bit) **Desktop:** ◆ Microsoft Windows 10 (64-bit) ◆ Microsoft Windows 8.1 (64-bit) ◆ Microsoft Windows 7 (32-bit and 64-bit)

Component	Runs on
Task Manager module	**PAM Server installed on:**
	◆ SUSE Linux Enterprise Server (SLES) 15 SP1 (64-bit)
	◆ SUSE Linux Enterprise Server (SLES) 12 (64-bit)
	◆ Red Hat Enterprise Linux Server (RHEL) 7 (64-bit)
	◆ Red Hat Enterprise Linux Server (RHEL) 8 (64-bit)
	◆ Microsoft Windows Server 2019 (64-bit)
	◆ Microsoft Windows Server 2016 (64-bit) with Powershell 4.0 and above
	◆ Microsoft Windows Server 2012 R2 (64-bit) with Powershell 4.0 and above
	◆ Microsoft Windows Server 2008 R2 (64-bit) with Powershell 4.0 and above
	NOTE: For password management, the target Windows operating systems should have a minimum PowerShell version of 2.0.
Privileged Account Sniffer	Microsoft Windows operating systems with .NET Framework 4.5

NOTE: Ensure that the operating system is running the vendor's latest maintenance patches.

1.1.2 Browsers

NOTE: Ensure that your browsers are running the latest version with all available patches.

- ◆ Microsoft Edge (with latest updates)
- ◆ Microsoft Internet Explorer 11(with latest updates)
- ◆ Mozilla Firefox (latest version)
- ◆ Google Chrome (latest version)

1.2 Minimum Hardware Requirements

Component	CPU	Memory	Hard Disk
Framework Manager and Dashboard	2.5 GHz or equivalent. Dual CPU recommended.	8 GB	5 GB + additional storage for audit data and logs
Agent	2.5 GHz or equivalent	4 GB	10 GB
Application SSO Agent	Dual CPU 2.5 GHz or equivalent.	8 GB	50 GB
Video Off-load agent	Quad CPU 2.5 GHz or equivalent.	8 GB	100 GB

NOTE: For virtual environments, Privileged Account Manager supports all the virtual platforms that are supported by that corresponding operating system. When you set up a virtual environment, the virtual machines must have two or more CPUs. To achieve performance results that are same as the physical machine testing results on ESX or in any other virtual environment, the virtual environment should provide the same memory, CPUs, disk space, and I/O as the physical machine recommendations.

2 Product Support

2.1 Database Servers and Clients

Access Method	Operating System	Database Servers	Database Clients (Native)	Database Client (3rd Party)
Credential Checkout	Any certified Linux manager platforms	• Oracle Database 12c • Oracle Database 11g	• SQL Developer SQL Plus	• DbVisualizer • Toad
		• Microsoft SQL Server 2016 • Microsoft SQL Server 2014 • Microsoft SQL Server 2012 • Microsoft SQL Server 2008	• SSMS (SQL Server Management Studio) • SQLCMD (Command line utility for Microsoft SQL)	
		• MySQL 5.7 • MySQL 5.6 • MariaDB 10.2	• SQL Workbench • MySQL Shell (Command line utility for MySQL)	
		• Sybase 16.0	• SSMS (SQL Server Management Studio) • SQLCMD (Command line utility for Microsoft SQL)	
		• PostgreSQL 9.6	• pgAdmin	

Access Method	Operating System	Database Servers	Database Clients (Native)	Database Client (3rd Party)
		◆ IBM Db2 v10.5 ◆ IBM Db2 v11.1 ◆ IBM Db2 v11.5	◆ IBM Data Studio	
Database Proxy (DB Proxy)	Any certified Linux manager platforms	◆ Oracle Database 12c ◆ Oracle Database 11g	◆ SQL Developer ◆ SQL Plus	◆ DbVisualizer ◆ Toad
		◆ Microsoft SQL Server 2016 ◆ Microsoft SQL Server 2014 ◆ Microsoft SQL Server 2012 ◆ Microsoft SQL Server 2008	◆ SSMS (SQL Server Management Studio) ◆ SQLCMD (Command line utility for Microsoft SQL)	
		◆ MySQL 5.7 ◆ MySQL 5.6 ◆ MariaDB 10.2	◆ SQL Workbench ◆ MySQL Shell (Command line utility for MySQL)	
		◆ Sybase 16.0	◆ SSMS (SQL Server Management Studio) ◆ SQLCMD (Command line utility for Microsoft SQL)	
		◆ PostgreSQL 9.6	◆ pgAdmin	
		◆ IBM Db2 v10.5 ◆ IBM Db2 v11.1 ◆ IBM Db2 v11.5	◆ IBM Data Studio	

Access Method	Operating System	Database Servers	Database Clients (Native)	Database Client (3rd Party)

Application SSO	◆ **Direct access mode:** Remote Desktop Session to any PAM certified Windows operating system.
	
	◆ **RemoteApp mode:**
	
	  ◆ Microsoft Windows Server 2012 R2
	
	  ◆ Microsoft Windows Server 2016
		Any database server	Any database client	Any database client

NOTE: Ensure that the database is running the vendor's latest maintenance patches.

2.2 Applications

Methods	Application
Credential Checkout	◆ System Applications Product (SAP) 7.x ◆ VMware ESXi 6.x ◆ VMware ESXi 5.x ◆ Lightweight Directory Access Protocol (LDAP) v3 Compliant ◆ OpenStack Key stone v2 and Key stone v3 ◆ Amazon Web Services (AWS) ◆ Microsoft Azure ◆ Microsoft Windows local accounts (over SSH) ◆ Linux local accounts (over SSH) ◆ AIX local accounts (over SSH)
Application SSO	Most Windows native applications, Windows .NET, Java, Web applications

NOTE: For Credential Checkout, although not officially certified, you can customize Privileged Account Manager to support applications such as Salesforce and so on.

2.3 Directory Services

- Microsoft Active Directory
- eDirectory 8.7.x
- OpenLDAP 2.4.x

3 Sizing Guidelines

The recommendations are based on the following test data:

- Framework Manager is running on Linux.
- A separate Audit Manager and Video Offload Server are configured per audit zone.
- Approximately 40 RDP sessions with 400 SSH sessions are running in parallel during these tests.
- The Framework Manager, SSH Relay and RDP Relay modules are installed on a single server.

3.1 Recommended Hardware Requirements

All the tests are executed on the following recommended hardware and the test results are documented in the sections that follow:

Component	CPU	Memory	Hard Disk
Framework Manager	2 CPUs @ 2.20GHz or above	8 GB	5 GB
Agent	2 CPUs @ 2.20GHz or above	4 GB	10 GB
Video Offload	4 CPUs @ 2.20GHz or above	8 GB	100 GB
Audit Manager	2 CPUs @ 2.20GHz or above	8 GB	100 GB

The storage requirement varies based on the data of the monitored sessions stored in PAM Audit Manager and the duration for which this data is stored.

3.2 PAM Audit Data Storage

The PAM session recordings tend to grow linearly by time, the following table gives you an estimation of the data size:

Average Session Time (in minutes)	Number of Sessions per day	Audit Data Storage Duration (number of days)	Video Size	Storage (Number of sessions * Storage Duration * Video Size)
2	5	365	1 MB	1825 MB
6	5	365	3 MB	5475 MB
10	5	365	5 MB	9125 MB

- The size of the video depends on the user's UI activity within an RDP session, the session's graphics resolution and the session duration.

- Depending on the user's UI activity within an RDP session, PAM optimizes size of recorded video.
  - In a session with zero to no UI activity and a typical PAM configuration of 5 FPS, the video file size is very small (for example 200KB per minute).
  - In a session with very high user activity, the video size can be as large as 1 MB per minute.
  - The following formula is used to calculate the daily video storage requirement:

    [Average Video size] X [Number video audited sessions per day] X [Average length of each session]

- In addition to videos, the PAM Audit manager also stores the keystroke information and related screen-shots of the user activity in a database. However, the disk space needed to store them is low compared to the storage needed to store videos.

3.3 Windows Agent Resource Utilization

For Recommended Hardware	CPU Usage	Memory Usage
Video Recording disabled	5%	20 MB
Video Recording enabled	10 - 60% *	200 MB *

* When video recording is enabled for the agent, there is a spike in CPU and memory utilization every two minutes (the default video setting). This spike can last for a few seconds. To avoid this spike it is recommended to deploy a separate PAM Video Offloading Server.

3.4 SSH Relay Manager Resource Utilization

With the recommended hardware, the resource utilization results for parallel SSH sessions are:

Resource Utilization (%)	100 SSH Sessions	200 SSH Sessions	400 SSH Sessions
CPU%	5%	10%	18%
Memory%	25%	32%	40%

- Key stroke activity was nominal, that is, executed 5-6 basic Linux commands per session.
- These tests do not capture the X11 sessions.

3.5 RDP Relay Manager Resource Utilization

With the recommended hardware, the resource utilization results for parallel RDP sessions are:

Resource Utilization (%)	5 RDP Sessions	25 RDP Sessions	50 RDP Sessions
CPU%	36%	63%	85%
Memory%	5%	10%	20%

NOTE

- The CPU and memory utilization for the RDP relay process was nominal.
- The keystroke activity was high, that is, open a notepad, write in it, and close the notepad every three seconds.

3.6 Resource Utilization in a Distributed Setup

The following setup is tested with 50 RDP sessions:

Setup	CPU (%)	Memory (%)
RDP Relay Manager	2	4
Audit Manager	85	35
Video Offload Server	5	10

3.7 Dashboard Performance

The cmdctrl database size is 5 GB for the following tests:

Dashboard Load Time (in seconds)	Number of Records	Number of Keystrokes	Duration of Records
8 (including the initial page load)	30000	1200000	1 day
1*	30000	1200000	1 week

* In case of 1 week, the dashboard page is already loaded.

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