APM System Requirements

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Chapter

1

The Basic System

Topics:

Basic System Hardware and Software Requirements

The basic GE Digital APM system consists of machines and software that are required for any GE Digital APM implementation to function. Implementation of the basic GE Digital APM system gives you the foundation-level analysis tools within GE Digital APM. This section of the documentation provides details on the hardware and software requirements for each machine within the basic system.

Other hardware and software may be required for a specific module or feature that is not required to deploy the basic GE Digital APM system. System requirements for specific modules and features are located in the documentation for that module or feature.

GE Digital APM Client

Hardware Requirements

The following hardware requirements outline the minimum hardware required for any machine or mobile device that will access the GE Digital APM system. These requirements account for the GE Digital APM software only. Additional hardware may be required on clients where other components are installed. These requirements may not be sufficient, depending upon how your system is configured.

Desktops and Laptops

Minimum requirements:

- Two Processor Cores, 2 GHz
- 4 GB RAM (8 GB RAM recommended)
- 8 GB of available hard drive space
- 13" screen
- 1024 X 768 screen resolution

Mobile Devices

You can use GE Digital APM on mobile devices either in the GE Digital APM mobile application or in the web browser on the device. The following information is generic and pertains to using the application on mobile devices in either of these scenarios. For specific information regarding the mobile application, see the GE Digital APM Mobile Application portion of the Getting Started section of this documentation.

Support for mobile devices is provided in two resolution view modes: full or limited. Full-resolution view mode supports access to the entire GE Digital APM system. Limited-resolution view mode supports limited access to overview pages and data collection. Resolution view mode is determined by the type of device that is used to access GE Digital APM, and is not a selectable option.

Note: Interaction with diagramming and design canvases is not available on touch-screen devices. If needed, use a mouse peripheral to utilize this functionality.

Minimum Requirements	Devices Tested
Minimum requirements for full-resolution view mode: • Two Processor Cores, 2 GHz • 2 GB RAM • 8 GB of available hard drive space • 7" screen • 1920 X 1200 screen resolution	Devices used in the GE Digital APM testing environment: • Apple iPad 4th Generation • Apple iPad Air • Apple iPad Air 2 • Apple iPad Mini 2 • Apple iPad Mini 3 • Microsoft Surface Pro 3
Minimum requirements for limited-resolution view mode: • Two Processor Cores, 1 GHz • 1 GB RAM • 8 GB of available hard drive space • 4" screen • 1024 X 600 screen resolution	Devices used in the GE Digital APM testing environment: • Samsung Galaxy Tab 4 (7") • Samsung Galaxy Tab 4 (10")

Small Screen Devices

Note: You can access only the Rounds Data Collection module in portrait mode on small screen devices.

Minimum Requirements	Devices Tested
Minimum requirements: • Four Processor Cores, 1.3 GHz • 1 GB RAM • 8 GB of available hard drive space • Minimum screen resolution of 320 pixels wide in portrait mode (4" or larger physical screen size recommended)	Devices used in the GE Digital APM testing environment: • Lenovo A1000 (480 X 800 screen resolution)

Software Requirements

The following software components are required on any machine or device that will access the GE Digital APM system using a browser. If the software meets the following requirements, you can access GE Digital APM using any operating system.

One of the following browsers is required for desktops, laptops, and mobile devices:

• Google Chrome

  Note:

  ◦ GE Digital APM V4.5.0.0.0 has been tested with Google Chrome version 84. To ensure you have the latest security updates, GE Digital recommends that you use the latest Google Chrome version available.
  ◦ If your system uses Data Guardian from Koingo Software and you use the Google Chrome browser, you may have to use the browser in Incognito mode to successfully access GE Digital APM.

• Internet Explorer 11
• Microsoft Edge
• Safari 8 (Mac only)

Note:

- You can access GE Digital APM via the browser on a mobile device, but it is recommended that you install and use the GE Digital APM mobile application for an enhanced experience. On a mobile device, to ensure that the mobile application works as intended, you should set your default browser to the desktop versions of Chrome or Internet Explorer (as opposed to the application versions).
- The method used to access Reference Documents in the GE Digital APM mobile application will vary depending on your device platform. For example, on Windows and Android devices, the first time you access Reference Documents, you will be prompted to select the application in which you want to open a file, and this selection will then become the default. Apple iOS will always prompt you to select an application. On all platforms, you will also be prompted when the platform for your device does not recognize the file type that it is attempting to download.

Mobile Application Supported Operating Systems

Supported Operating Systems

Important:

- Any management policy applied to mobile devices must be set up to allow the required permissions for the GE Digital APM mobile application. If restrictions are placed on iOS, Windows, or Android devices by a global policy or mobile device management system, device storage, scanning, photography, location services, and other functionality may be disabled.
- If you are using a Windows device, ensure that Windows App Store access is enabled.
- Ensure that the application is distributed to all relevant devices.

The following table lists the operating systems and corresponding versions that the GE Digital APM mobile application supports.

Operating System	Version(s) Supported
iOS	11, 12, and 13
Android	5, 6, 7, 8, and 9
Windows	Windows 10 (64 bit)

Note: The method used to access Reference Documents in the GE Digital APM mobile application will vary depending on your device platform. For example, on Windows and Android devices, the first time you access Reference Documents, you will be prompted to select the application in which you want to open a file, and this selection will then become the default. Apple iOS will always prompt you to select an application. On all platforms, you will also be prompted when the platform for your device does not recognize the file type that it is attempting to download.

GE Digital APM Server

Hardware Requirements

The following hardware requirements outline the minimum hardware required for any computer that will serve as the GE Digital APM Server. These requirements account for the GE Digital APM software only. Additional hardware may be required on a GE Digital APM Server machine on which other components are installed. These minimum requirements may not be sufficient, depending upon how your system is configured and the anticipated user load the system must service.

Application Server

- Eight processor cores, 2+ GHz
- 24 GB RAM
- 100 GB of available hard drive space
- 7.2K RPM drive

ActiveMQ Server

- Four processor cores, 2+ GHz
- 16 GB RAM
- 100 GB of available hard drive space
- 7.2K RPM drive

ElasticSearch Server

- Eight processor cores, 2+ GHz
- 24 GB RAM
- 100 GB of available hard drive space
- 7.2K RPM drive

Redis Server (Applicable to both Linux and Windows servers)

- Four processor cores, 2+ GHz
- 16 GB RAM
- 100 GB of available hard drive space
- 7.2K RPM drive

A minimum of a 100BASE-TX switched network is required between the GE Digital APM Server, ElasticSearch Server, and the Database Server with an average network latency < 100ms.

Note: For maximum system availability, we recommend deploying GE Digital APM servers in a clustered configuration to facilitate load balancing and failover in the event of a hardware problem. GE Digital APM supports Microsoft Clustering Services and Network Load Balancing for clustered deployment configurations.

If you are using a virtual machine (VM) to host your GE Digital APM Server, we recommend that:

- You increase the physical server CPU and hard drive space requirements by 20% to ensure that the application will perform equivalently in a virtualized environment.
- You double the physical server memory requirements.
- Each VM has its own dedicated processor cores and memory allocation to ensure appropriate performance.

GE Digital APM supports Hyper-V and VMWare platforms.

These requirements may not be sufficient, depending upon how your system is configured and the anticipated user load. Parameters that affect the hardware requirements include the number of users, modules purchased, database size, and other factors that can vary from one customer to another. For help refining your specific system requirements, contact GE Digital APM .

Software Requirements

Application Server Requirements

The following software components are required on any machine that will serve as the GE Digital APM Server. This table is intended to be used as a reference of the behavior of the GE Digital APM Server and Add-ons installer as it relates to each component. In addition to the components that appear in this list, there are configuration settings that will need to be set depending upon your operating system.

A Windows Server 2016 Version 1607 operating system is required to properly run GE Digital APM software, and must be installed on the machine that will serve as the GE Digital APM Server. The GE Digital APM testing environment uses Windows Server 2016 Version 1607.

Software Name and Version	Where You Can Obtain It	Required?	Behavior of GE Digital APM Server and Add-ons Installer
IIS 8.5 -and- IIS 6.5 WMI Compatibility Roles	Microsoft	Yes	If this is not found, an error message will appear.
Java OpenJDK V1.8.0_111 or Oracle JDK V1.8.0_73	Oracle Corporation	Yes	If this is not found, an error message will appear.
Microsoft ADOMD.Net	Microsoft	Yes, if Rounds will be installed.	If this is not found, the installation will continue.
Microsoft Visual C++ Redistributable Package (x86) • Microsoft Visual C++ 2015 Redistributable Package (x64) • Microsoft Visual C++ 2015 Redistributable Package (x86) • Microsoft Visual C++ 2013 Redistributable Package (x64) • Microsoft Visual C++ 2013 Redistributable Package (x86)	GE Digital APM	Yes	If this is not found, the installer will install it automatically.
ReportViewer2015	Microsoft	Yes	If this is not found, the installer will install it automatically.
WinMerge	This is a third-party component, and must be obtained from WinMerge Development.	Yes, if you will use the GE Digital APM Database Comparison Tool. This tool is required if you are upgrading GE Digital APM, but is not required if you are performing a first-time installation.	If this is not found, an error message will appear. However, you can continue through the installation process without installing WinMerge.

ActiveMQ or ElasticSearch Server Requirements

The Windows Server 2016 Version 1607 operating system is required on the machine that will serve as the ActiveMQ or Elasticsearch server. The GE Digital APM testing environment uses Windows Server 2016 Version 1607.

Redis Server (Windows based) Requirements

The Windows Server 2016 Version 1607 operating system is required on the machine that will serve as the Redis server. The GE Digital APM testing environment uses Windows Server 2016 Version 1607.

Redis Server (Unix based) Requirements

One of the following operating systems is required on the machine that will serve as the Redis server:

• Ubuntu Server 18.04
• Ubuntu Server 20.04

The GE Digital APM testing environment uses Ubuntu Server 18.04 or 20.04.

GE Digital APM Database Server

Hardware Requirements

The following hardware requirements outline the minimum hardware required for any machine that will serve as the GE Digital APM Database Server. These requirements account for the GE Digital APM software only. Additional hardware may be required on GE Digital APM Database Server machines where components other than the GE Digital APM database are installed. These requirements may not be sufficient, depending upon how your system is configured.

• Eight Processor Cores, 2+ GHz
• 32 GB RAM
• 200 GB of available hard drive space on, at a minimum, 10K RPM drives

Note also that:

• While GE Digital APM supports the use of RAID 5, which has benefits in its recoverability features, GE Digital APM recommends the use of RAID 10 for the best overall database performance.
• Oracle requires instance tuning to use memory cache effectively. For Oracle Database Servers, a comparable UNIX-based system can be used.
• A minimum of a 100BASE-TX switched network is required between the GE Digital APM Server and the GE Digital APM Database Server.

Software Requirements

GE Digital APM supports the use of an Oracle or SQL Server Database Server.

Oracle Requirements

GE Digital APM requires that you use the Enterprise Edition or Standard Edition of Oracle Server 12.1 or 12.2. Oracle Multimedia is required in all cases. The GE Digital APM testing environment uses Oracle Server 12.1.0.1, 12.1.0.2, and 12.2.0.1.0.

SQL Server Requirements

GE Digital APM requires that you use SQL Server 2016 or SQL Server 2017. The GE Digital APM testing environment uses SQL Server 2016 SP1 and SQL Server 2017 RTM.

Important: Only access, add, or modify data related to GE Digital products via approved GE Digital procedures and processes. Accessing, adding, or modifying data by any other method may result in data corruption, and may void your GE Digital product warranty. For more information, consult a member of the GE Digital Professional Services department.

SQL Server Report Server

Hardware Requirements

The following hardware requirements outline the minimum hardware required for any machine that will serve as the SQL Server Report Server. These requirements account for the GE Digital APM software only. Additional hardware may be required on a SQL Server Report Server machine where other components are installed. These requirements may not be sufficient, depending upon how your system is configured.

- Two Processor Cores, 2+ GHz
- 8 GB RAM
- 25 GB of available hard drive space

If you are using a virtual machine (VM) to host your SQL Server Report Server, we recommend that:

- You increase the physical server CPU and hard drive space requirements by 20% to ensure that the application will perform equivalently in a virtualized environment.
- You double the physical server memory requirements.
- Each VM have its own dedicated processor cores and memory allocation to ensure appropriate performance.

GE Digital APM supports Hyper-V and VMWare platforms.

These requirements may not be sufficient, depending on how your system is configured. Parameters that affect the hardware requirements include the number of users, modules purchased, database size, and other factors that can vary from one customer to another. For help refining your specific system requirements, consult a member of the GE Digital APM Professional Services department.

Software Requirements

The following software components are required on any machine that will serve as the SQL Server Report Server.

Software Name and Version	Where You Can Obtain It	Required?	Behavior of Meridium APM Server and Add-ons Installer
SQL Server Reporting Services 2014 -or- SQL Server Reporting Services 2016	Microsoft	Yes	If it is not found, the installer will close.

SQL Server Analysis Services

Hardware Requirements

The following hardware components are the basic hardware that are required for supporting SQL Server Analysis Services in APM Metrics and Scorecards module. These requirements are specified only for the GE Digital APM software. Additional hardware may be required on a SQL Server Analysis Services machine where other components are installed. These requirements may not be sufficient and may change depending upon how your system is configured.

- Two Processor Cores, 2+ GHz
- 8 GB RAM
- 25 GB of available hard drive space

Software Requirements

One of the following software is required on any machine that will serve as the SQL Server Analysis Services server.

Software Name and Version	Where You Can Obtain It
SQL Server Analysis Services 2014 (Multi-Dimensional mode only)	Microsoft
SQL Server Analysis Services 2016 (Multi-Dimensional mode only)	

GE Digital APM Supported Software and Devices

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
All GE Digital APM Components	.NET Framework 4.5	None				✓	✓	✓	✓	✓
	.NET Framework 4.7.2	None			✓					
	.NET Framework 4.7.2 and .NET Core 3.1.1	None	✓	✓						
AMS Analytics	AMS Intelligent Device Manager V13	None				✓	✓	✓	✓	✓
APM System Monitoring	MongoDB Community Edition	None	✓	✓	✓	✓	✓	✓	✓	✓

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
ASI for SAP	SAP ECC 6.0 (Enhancement Packs [EhP] 1 through 8)	The following SAP system versions are required to update items in SAP with changes made in ASI: • To create ASI/ASM objects in SAP and import ASI/ASM objects from SAP: SAP ECC 6.0 - Enhancement Packs (EhP) 1 -8. • To update ASI/ASM objects in SAP:SAP ECC 6.0 - Enhancement Packs (EhP) 5 -8.	✓	✓	✓	✓	✓	✓	✓	✓
	SAP S/4 HANA on-premises (1509, 1610, 1709, 1809)	None	✓	✓	✓	✓	✓	✓	✓	
Calibration Management	CMX Calibration Management Software Version 2 (2.10.114.0)		✓	✓	✓	✓	✓	✓	✓	✓
	GE Device Driver 1.6.0.0	None	✓	✓	✓	✓	✓	✓	✓	✓
GE Analytics	Enterprise Impact V18.2	This integration supports up to a maximum of 30K tags. Hierarchy synchronization with the maximum number of tags can take up to 24 hours and should be planned accordingly.				✓				
	RabbitMQ server V3.5.3 and above	None				✓	✓	✓	✓	✓

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
GE Digital APM Client Web Browser	Google Chrome	GE Digital APM V4.5.0.0.0 has been tested with Google Chrome version 84. To ensure you have the latest security updates, GE Digital recommends that you use the latest Google Chrome version available.	✓	✓	✓	✓	✓			
	Internet Explorer 11	None	✓	✓	✓	✓	✓	✓	✓	✓
	Microsoft Edge	None	✓	✓	✓	✓	✓	✓	✓	✓
	Safari 8 (Mac only)	None	✓	✓	✓	✓	✓	✓	✓	✓
GE Digital APM Database	Oracle Server 12.1 Enterprise Edition or Standard Edition. In either case, Oracle Multimedia is required.	The GE Digital APM testing environment uses Oracle Server 12.1.0.1, 12.1.0.2, and 12.2.0.1.0.	✓	✓	✓	✓	✓	✓	✓	✓
	SQL Server 2012 (SP3 or higher)	The GE Digital APM testing environment uses SQL Server 2012 Standard Edition SP3.			✓	✓	✓	✓	✓	✓
	SQL Server 2016	The GE Digital APM testing environment uses SQL Server 2016 SP1.	✓	✓	✓	✓	✓	✓	✓	
	SQL Server 2017	The GE Digital APM testing environment uses SQL Server 2017 RTM.	✓	✓						
GE Digital APM Servers	Windows Server 2016 Version 1607	None	✓	✓	✓	✓	✓	✓	✓	
GE Digital ActiveMQ Server	Windows Server 2016 Version 1607	The GE Digital APM testing environment uses Windows Server 2016 Version 1607.	✓	✓						

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
GE Digital Elastic Search Server	Windows Server 2016 Version 1607	The GE Digital APM testing environment uses Windows Server 2016 Version 1607.	✓	✓						
GE Digital Redis Servers	Windows Server 2016 Version 1607	The GE Digital APM testing environment uses Windows Server 2016 Version 1607.	✓	✓	✓	✓	✓	✓		
	Ubuntu 18.04	The GE Digital APM testing environment uses Ubuntu Server 18.04 and 20.04.	✓	✓	✓	✓				
	Ubuntu 20.04		✓	✓	✓	✓				
Metrics and Scorecards	Microsoft SQL Server Analysis Services 2012	None		✓	✓	✓	✓	✓	✓	✓
	Microsoft SQL Server Analysis Services 2014	None	✓	✓	✓	✓	✓	✓	✓	✓

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
OT Connect	OT Connect OPC HDA Protocol Adapter	Tested internally with: • OSIsoft® PI Server version 3.4.390.16 with PI OPC DA/HDA Server version 1.2.7.0. • OSIsoft® PI HDA Server 2016, version 1.2.7.5.	✔	✔						
	OT Connect OPC DA Protocol Adapter **Note:** The OPC DA Protocol Adapter is available with GE Digital APMV4.4.0.0.2.	Tested internally with: • OSIsoft® PI Server version 3.4.390.16 with PI OPC DA/HDA Server version 1.2.7.0. • OSIsoft® PI DA Server Server 2016, version 3.0	✔	✔						
	OT Connect OSI PI Protocol Adapter Requires Pi AF Client 2018 SP3 Patch 2. **Note:** The OSI PI AF available with GE Digital APMV4.4.0.0.2.	Tested internally with: • OSIsoft® PI Server 2016 Asset Framework (AF), Version 2.8.	✔	✔						
	OT Connect GE Historian Protocol Adapter Requires Historian 7.2+ Client Access Assembly, targeting supported historian servers 4.0 and above. **Note:** The GE Historian Protocol Adapter is available with GE Digital APMV4.4.0.0.2.	Tested internally with: • GE Historian 7.2	✔	✔						

GE Digital APM Co mponen ts	Supported Third Party Components	Notes	GE Digita l APM V4.5.0 .0.0	GE Digita l APM V4.4.0 .0.0	GE Digita l APM V4.3.1 .0.0	GE Digita l APM V4.3.0 .7.0	GE Digita l APM V4.3.0 .6.5	GE Digita l APM V4.3.0 .6.0	GE Digita l APM V4.3.0 .5.0	GE Digita l APM V4.3.0 .0.0
		Note: The above information about OPC Servers and process historians are those that have been tested for the OT Connect feature. Other OPC Compliant servers can also leverage OT Connect successfully, as OT Connect supports the following adapters: • OPC Foundation Historical Data Access (OPC-HDA) specification version 1.20, (AKA 1.2). The OPC HDA server offers the following capabilities: ◦ LastReading ◦ StartToEndReadings ◦ SubscribeReadings • OPC DA Protocol Adapter that can connect to OPC Classic DA 3.0 servers. The OPC DA server offers the following capabilities: ◦ LastReading ◦ SubscribeReadings • OSI PI Protocol Adapter that can connect to PI Server 2010 and later through the Asset Framework (AF) Protocol. The OSI PI Protocol Adapter offers the following: ◦ LastReading ◦ SubscribeReading ◦ GetStartEndReadings ◦ GetBeforeEndReadings • GE Historian Protocol Adapter that can connect to Proficy Historian 4.0 and later through the Client Access API. The GE Historian Protocol Adapter offers the following Capabilities: ◦ LastReading ◦ SubscribeReading ◦ GetStartEndReadings ◦ GetBeforeEndReadings The OT Connect Adapter can be installed and run on the OPC Server in CHECK MODE to validate the capabilities of specific OPC Servers and process historians on a case by case basis. Refer to the deployment section for more information on the OT Connect Adapter. **Note:** • OT Connect does not support OPC PI Server Collectives. • To support direct consumption of Readings into Asset Health Indicators (AHIs) and triggered Policies, the server does need to implement the End aggregate.								

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
Process Data Integration	OSIsoft® PI Server version 3.4.390.16 with PI OPC DA/HDA Server version 1.2.7.0.	None				✔	✔	✔	✔	✔
	Matrikon Simulation tool, which simulates the MatrikonOPC Historical Data Access Suite	Tag browsing must be enabled on the machine on which the Honeywell Uniformance® Process History Database (PHD) OPC Server software is installed. To enable tag browsing, change the BrowseMode registry setting to 1, and then restart the machine. For more information, refer to the Honeywell Uniformance® PHD OPC Server User Guide.				✔	✔	✔	✔	✔
	IP21 (Aspen ONE V8.0) Version 12.0.0.20	A direct connection to IP21 provides access to DA values only.				✔	✔	✔	✔	✔
	IP21 (Aspen ONE V8.0) Version 12.0.0.20 with MatrikonOPC IP21 Server Version 2.3.1.5322	None				✔	✔	✔	✔	✔
	Honeywell Uniformance® Process History Database (PHD) Version 310.1.0.	None				✔	✔	✔	✔	✔
	GE Historian 7.0 SP1	GE Historian provides access to HDA values only.				✔	✔	✔	✔	✔
	GE Cimplicity V9.5	GE Cimplicity provides access to DA values only.				✔	✔	✔	✔	✔

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
R Scripts	DeployR Open 8.0.0	The GE Digital APM testing environment uses DeployR Open 8.0.0.	✔	✔	✔	✔	✔	✔	✔	✔
	DeployR Enterprise 8.0.0	The GE Digital APM testing environment uses DeployR Enterprise 8.0.0.	✔	✔	✔	✔	✔	✔	✔	✔
	Machine Learning Server 9.2.1 or 9.3.0	The GE Digital APM testing environment uses Machine Learning Server 9.3.0.	✔	✔	✔	✔				

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
Report Designer	Microsoft Visual Studio 2013 Professional	None				✓	✓	✓	✓	✓
	Microsoft Visual Studio 2015 Professional	None			✓	✓				
	Microsoft Visual Studio 2017 Professional	None	✓	✓	✓					
	Microsoft Visual Studio 2019 Professional	None	✓							
	Microsoft SQL Server Data Tools - Business Intelligence for Visual Studio 2013	• You can view a report designed using a lower version of Microsoft SQL Server Data Tools (SSDT) in a higher version of SQL Server Report Server (SSRS). However, you cannot view a report designed using a higher version of SSDT in a lower version of SSRS. • If you install SSDT for Microsoft Visual Studio 2019, install Microsoft Reporting Service Projects (VSIX 2.6.2). For more information on how to install Microsoft Reporting Services Projects (VSIX 2.6.2), refer to the Microsoft SSDT documentation.				✓	✓	✓	✓	✓
	Microsoft SQL Server Data Tools - Business Intelligence for Visual Studio 2015				✓					
	Microsoft SQL Server Data Tools - Business Intelligence for Visual Studio 2017 (15.8.0)		✓	✓	✓					
	Microsoft SQL Server Data Tools - Business Intelligence for Visual Studio 2019		✓							

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
SQL Server Report Server	Microsoft SQL Server Reporting Services 2012	You can view a report designed using a lower version of Microsoft SQL Server Data Tools (SSDT) in a higher version of SQL Server Report Server (SSRS). However, you cannot view a report designed using a higher version of SSDT in a lower version of SSRS.		✓	✓	✓				
	Microsoft SQL Server Reporting Services 2014		✓	✓	✓	✓				
	Microsoft SQL Server Reporting Services 2016		✓	✓	✓					
	Microsoft SQL Server Reporting Services 2017		✓	✓						
Rounds (iOS, Android and Windows tablet devices)	Any operating system that meets the GE Digital APM Client operating system requirements.	None	✓	✓	✓	✓	✓	✓	✓	✓
Rounds (Windows Mobile Devices)	Windows Mobile 2003, 5.0, 6.0, and 6.5	None				✓	✓	✓	✓	✓
	Windows Embedded Handheld 6.5	None				✓	✓	✓	✓	✓

GE Digital APM Components	Supported Third Party Components	Notes	GE Digital APM V4.5.0.0.0	GE Digital APM V4.4.0.0.0	GE Digital APM V4.3.1.0.0	GE Digital APM V4.3.0.7.0	GE Digital APM V4.3.0.6.5	GE Digital APM V4.3.0.6.0	GE Digital APM V4.3.0.5.0	GE Digital APM V4.3.0.0.0
Rules	Microsoft Visual Studio 2013 Professional. Microsoft Visual Studio 2015 Shell must be installed after Microsoft Visual Studio 2013 Professional.	None				✓	✓	✓	✓	✓
	Microsoft Visual Studio 2017 or 2019 Professional	None	✓	✓	✓					
	MSXML	None	✓	✓	✓	✓	✓	✓	✓	✓
SAP Interfaces	SAP ECC 6.0 (Enhancement Packs [EhP] 1 through 8)	None	✓	✓	✓	✓	✓	✓	✓	✓
	SAP S/4 HANA on-premises (1509, 1610, 1709, 1809, 1909)	• 1909: Support began from GE Digital APM V4.4.0.0.0 • 1809: Support began from GE Digital APM V4.3.0.7.0 • 1709: Support began from GE Digital APM V4.3.0.6.0 • 1610: Support began from GE Digital APM V4.3.0.1 (Foundation), V4.3.0.3 added WMI and TC. • 1509: Support began from GE Digital APM V4.3.0.1 (Foundation) V4.3.0.3 added WMI and TC.	✓	✓	✓	✓	✓	✓	✓	
Search	Elasticsearch 6.7.0	None	✓	✓	✓	✓	✓	✓	✓	✓

Supported Devices

Important:

Any management policy applied to mobile devices must be set up to allow the required permissions for the GE Digital APM mobile application. If restrictions are placed on iOS, Android, or Windows devices by a global policy or mobile device management system, then device storage, scanning, photography, location services, and other functionality may be disabled.

If you are using a Windows device, ensure that Windows App Store access is enabled.

GE Digital APM Components	Device	Notes	V4.5.0.0	V4.4.0.0	V4.3.1.0	V4.3.0.7.0	V4.3.0.6.5	V4.3.0.6.0	V4.3.0.5.0	V4.3.0.0
Calibration Management*	Fluke 74x Documenting Process Calibrator	None	✓	✓	✓	✓	✓	✓	✓	✓
	Fluke 75x Documenting Process Calibrator	None	✓	✓	✓	✓	✓	✓	✓	✓
	Fluke 729 Automatic Pressure Calibrator	None	✓	✓						
	GE Druck Calibrators: • Druck DPI611 - Pressure Calibrator • Druck DPI612 - Flex Pressure Calibrator • Druck DPI620 - Multifunction Calibrator • Druck DPI620-IS - Intrinsically Safe Multifunction Calibrator • Druck DPI620G – Advanced Multifunction Calibrator, HART/Fieldbus Communicator • Druck DPI620G-IS - Intrinsically Safe Advanced Multifunction Calibrator, HART/Fieldbus Communicator	None	✓	✓	✓	✓	✓	✓	✓	✓

GE Digital APM Components	Device	Notes	V4.5.0.0.0	V4.4.0.0.0	V4.3.1.0.0	V4.3.0.7.0	V4.3.0.6.5	V4.3.0.6.0	V4.3.0.5.0	V4.3.0.0.0
Rounds	Android, iOS, or Windows tablets that meets the GE Digital APM Client operating system requirements listed in the GE Digital APM Client requirements.	None	✓	✓	✓	✓	✓	✓	✓	✓
	Windows Mobile handheld devices that meet the operating system requirements listed in the previous table in this topic and the component requirements listed below in this table.	None				✓	✓	✓	✓	✓
	Barcode Functionality									
	Device cameras for Android, iOS, and Windows tablets	This feature is available only when using the GE Digital APM mobile application.	✓	✓	✓	✓	✓	✓	✓	✓
	Intermec and Motorola scanners	Devices used in the GE Digital APM testing environment: • Intermec CN70 device • Motorola MC9500-K Series device • Zebra (previously Motorola Psion) Omnii XT15 with 1D barcode reader Only Code 39 barcodes are supported.				✓	✓	✓	✓	✓
	Zebra TC-75X Touch Computer Integrated Barcode Scanner	Devices used in the GE Digital APM testing environment: • Zebra TC-75X Touch Computer (DataWedge version 6.4 or higher)	✓	✓	✓					
	RFID Functionality									
	Intermec 70 Series scanners with the Intermec IP30 Handheld RFID reader	Device used in the GE Digital APM testing environment: • Intermec CN70 device with an Intermec IP30 Handheld RFID reader The following RFID Types are supported: • International Standards Organization 18000-6B Generation 2 • Electronic Product Code Global Class 1, Generation 2				✓	✓	✓	✓	✓

GE Digital APM Components	Device	Notes	V4.5.0.0	V4.4.0.0	V4.3.1.0	V4.3.0.7.0	V4.3.0.6.5	V4.3.0.6.0	V4.3.0.5.0	V4.3.0.0.0
	ecom/Intermec i.roc Ci70 -Ex handheld device with LF or HF RFID reader	Device used in the GE Digital APM testing environment: • i.roc Ci70-Ex device with eCom LF RFID reader (TLB30) • i.roc Ci70-Ex device with eCom HF RFID reader (UN113) The following RFID Types are supported: • International Standards Organization 18000-6B Generation 2 • Electronic Product Code Global Class 1, Generation 2				✓	✓	✓	✓	✓
	Zebra TC-75X Touch Computer NFC RFID reader	Device used in the GE Digital APM testing environment: • Zebra TC-75X Touch Computer (DataWedge version 6.4 or higher)	✓	✓	✓					
Thickness Monitoring *	GE DMS Go	None	✓	✓	✓	✓	✓	✓	✓	✓
	GE DMS Go+	None	✓	✓	✓	✓	✓	✓	✓	✓
	GE DMS2	None	✓	✓	✓	✓	✓	✓	✓	✓
	Olympus (Panametrics) 37DL Plus Ultrasonic Thickness Gage	None	✓	✓	✓	✓	✓	✓	✓	✓
	Olympus (Panametrics) 38DL Plus Ultrasonic Thickness Gage	None	✓	✓	✓	✓	✓	✓	✓	✓

* Thickness Monitoring and Calibration Management use the Devices Interface, which is a UI that is configured to support the transfer of data between GE Digital APM and devices that GE Digital APM supports.

Supported Languages for Translation

License Requirements

Each language for translation available in the GE Digital APM system is enabled by activating a specific license. Licenses for language translation are named Language-<Supported Language>, where <Supported Language> is the name of a supported language. The following languages are supported:

• English

- Spanish
- Japanese
- Simplified Chinese
- Russian
- Portuguese
- German
- French
- Dutch
- Italian
- Polish

Deploying Translations

To activate licenses for language translation, consult the Activate Licenses section of the documentation .

Chapter 2

System Requirements for Modules

Topics:

- Life Cycle Cost Analysis System Requirements
- Layers of Protection Analysis (LOPA) System Requirements
- Management of Change (MOC) System Requirements
- Metrics and Scorecards System Requirements
- OT Connect System Requirements
- Policy Designer System Requirements
- Production Loss Analysis (PLA) System Requirements
- R Scripts System Requirements
- RBI 581 System Requirements
- Recommendation Management System Requirements
- Reference Documents System Requirements
- Risk Based Inspection (RBI) System Requirements
- Root Cause Analysis (RCA) System Requirements
- Rounds System Requirements
- Reliability Analytics System Requirements
- Reliability Centered Maintenance (RCM) System Requirements
- Reports System Requirements
- Rules System Requirements
- SIS Management System Requirements
- Thickness Monitoring (TM) System Requirements

APM Connect System Requirements

License Requirements

APM Connect has a three-tier license system that enables the APM Connect Framework. One of the following license types is required to take advantage of the APM Connect functionality:

- APM Connect Basic
- APM Connect Plus
- APM Connect Studio

    Note: APM Connect Studio contains numerous libraries that integrate with third-party products, such as GeoRaster. Questions regarding linking these libraries with GE Digital APM should be directed to a member of the GE Digital APM Professional Services department on an individual basis. Specific requirements of third-party products is outside the scope of APM Connect Studio support.

Additional Licensing

The following additional licenses are required to take advantage of the SAP Adapters:

SAP Integration Interfaces:

    Enables the SAP Equipment, Functional Location, Work History, and Notification Creation Adapters.

SAP Technical Characteristics:

    Enables the SAP Technical Characteristics Adapter.

SAP Work Management:

    Enables the SAP Work Management Adapter.

The following additional license is required to take advantage of the SAP PI Adapters:

SAP Process Integration:

    Enables the SAP PI Adapters.

The following additional license is required to take advantage of the Maximo Adapters:

Maximo Interfaces:

    Enables the Maximo Equipment, Functional Location, Work History, Service Request, and Work Order Generation Adapters.

Note: There is no additional license required to take advantage of the APM Connect Data Loader functionality.

UDLP Versions

The following UDLP versions are currently supported in GE Digital APM:

- V2.9.0

Additional Components Required for APM Connect

In addition to the basic GE Digital APM system architecture, your system must also contain the following components:

Minimum Software Requirements

- Windows Server 2008 R2
- Windows Server 2012

- Windows Server 2016
- Java SE 8 Update 131 or higher

Recommended Software for APM Connect Server

- Windows Server 2012 R2
- Windows 7 64-bit OS

Browser Requirements for APM Connect Server

Web Browser	Recommended or Supported
Google Chrome	Recommended
Microsoft Internet Explorer 10	Supported
Microsoft Internet Explorer 11	Supported

Minimum Hardware Requirements for APM Connect Server

- Four Processor Core, 2.0GHz
- 8 GB RAM
- 100 GB Free Disk
- 100 MB Network Interface

Recommended Hardware for APM Connect Server

- I5 Processor, 2.0 + GHz
- 32 GB RAM
- 300 GB Free Disk
- 1 GB Network Interface

Tip: APM Connect is input and output intensive, and requires a large amount of storage space. Faster storage is the best way to improve the performance of APM Connect.

Depending on how your system is configured, these requirements may not be sufficient. Parameters that affect the hardware requirements include the number of users, modules purchased, database size, and other factors that can vary from one customer to another. For help refining your specific system requirements, contact GE Digital

System Architecture for EAM Adapters

Figure 1: Single Server Configuration (Recommended)

The single server configuration is the simplest way to configure APM Connect. However, it does include an embedded database. The following image depicts this configuration.

Note: Only one EAM system is supported for each APM tenant or database.
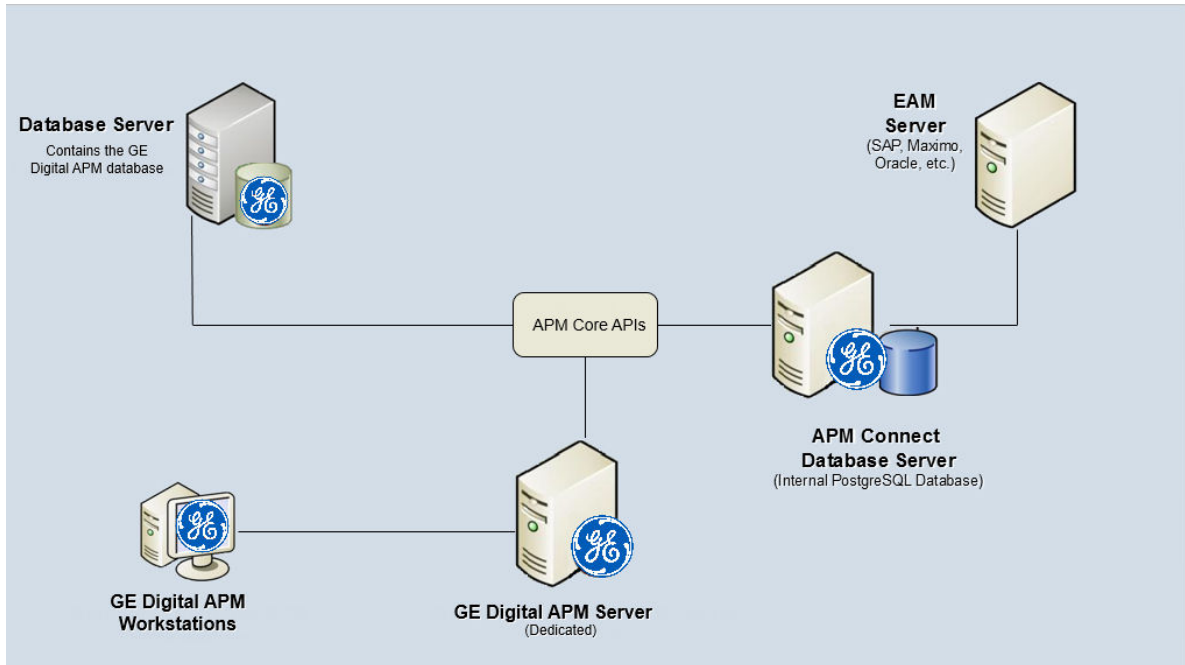
Many organizations choose to separate their databases. It is possible to install the intermediate repository database on an external server, and to keep the APM Connect Systems database on a different server. The following image depicts this configuration.

Note: The external configuration will affect performance. The single server configuration results in faster performance.
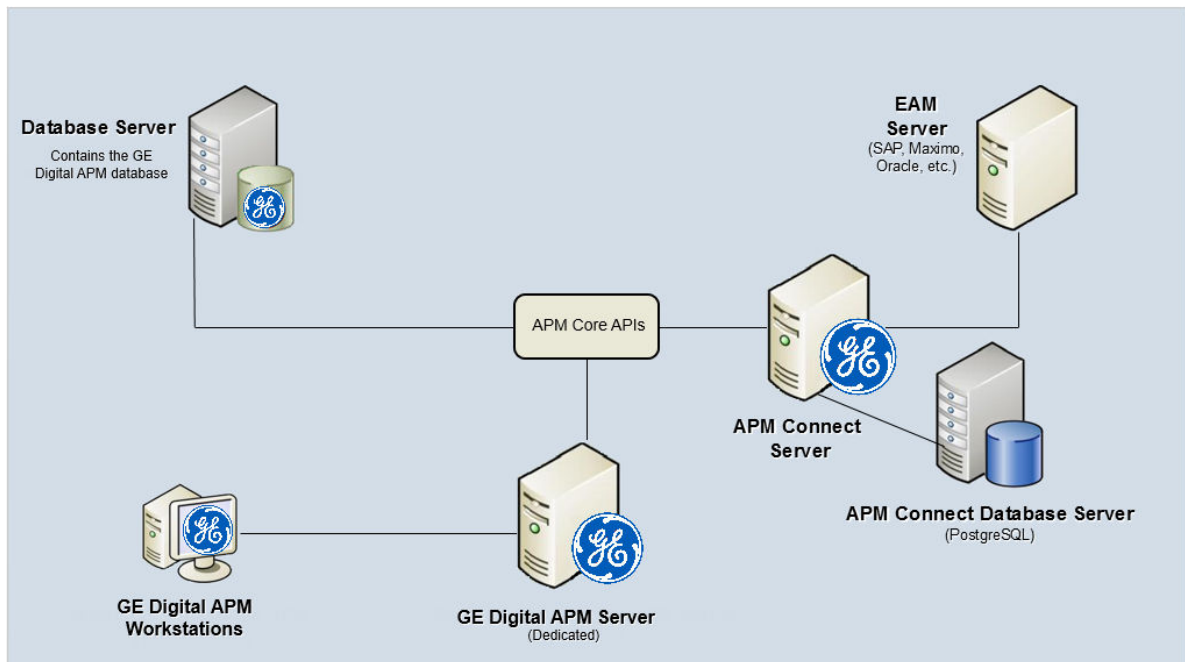

Figure 2: External Database Configuration

Deploying APM Connect

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for APM Connect.

Supported Features in APM Now

In the APM Now environment, the following features are unavailable:

- ACA for SAP
- ASI for SAP
- Maximo Integration
- SAP PI

All other APM Connect features are available.

APM Foundation System Requirements

License Requirements

This feature is available with the core GE Digital APM application; no specific license is required.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying APM Foundation

APM Foundation comprises the foundation-level analysis tools that are available after you have installed and configured the basic GE Digital APM system architecture.

Supported Features in APM Now

In the APM Now environment, query results do not include cases, alerts, or time series data, and global search results do not include alerts or time series data. All other standard GE Digital APM product features for APM Foundation are available.

Asset Criticality Analysis (ACA) System Requirements

License Requirements

This feature is available in the GE Digital APM application with the Meridium Core license; no specific license is required.

ACA integration with SAP is only available in on-premises releases.

To update your SAP system to reflect the criticality value that is determined in ACA, the licenses SAP Interfaces – Foundation and SAP Interfaces - Criticality Assessment are also required.

Note: For supported SAP releases, see the SAP System Requirements section in APM Connect System Requirements.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Asset Criticality Analysis

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Asset Criticality Analysis.

Supported Features in APM Now

In the APM Now environment, SAP Integration for ACA is not supported. All other standard GE Digital APM product features for this module are available.

Asset Health Manager (AHM) System Requirements

License Requirements

The Asset Health license and the licenses for the modules that you want to use with AHM are required to take advantage of AHM functionality.

Additional Components Required

When you install the GE Digital APM Server, the Asset Health Indicator Service is installed automatically. In order for the Asset Health Indicator Service to function as described within this documentation, you must start the Asset Health Indicator Service. After you do so, the Asset Health Indicator Service will allow the health indicator status values to be updated automatically.

In addition, Asset Health Manager can be used to its complete potential only when it is integrated with one or more of the following modules:

- Rounds
- Asset Strategy Management
- Policy Designer
- Metrics and Scorecards

Your system must also meet the system requirements for any of these additional modules that you plan to use with Asset Health Manager.

System Architecture

The following image shows the architecture components that are required to support this module.
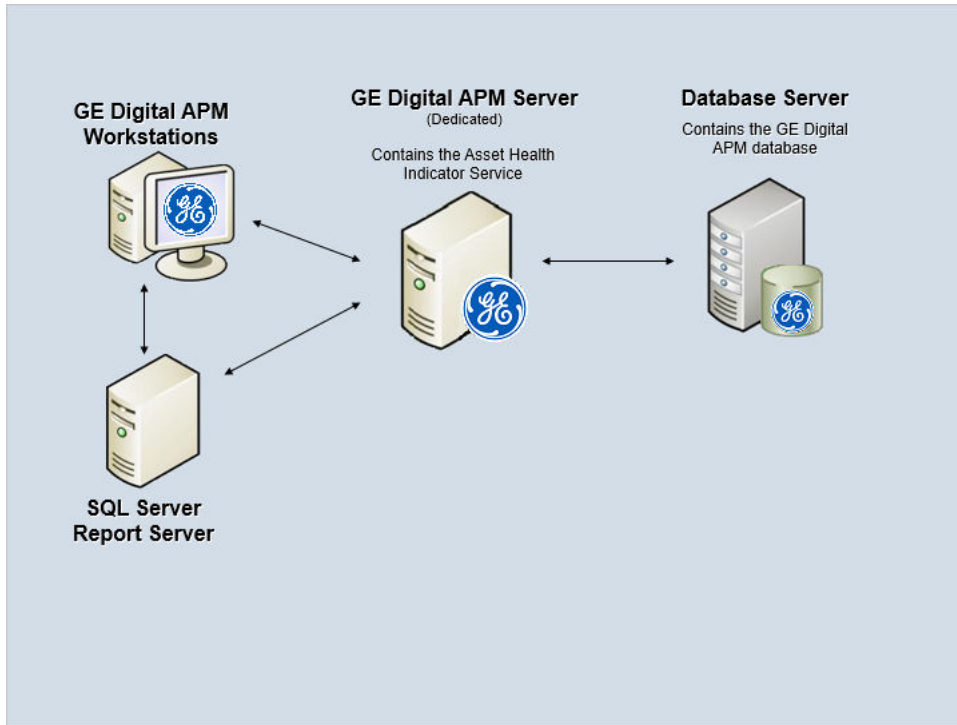
Deploying Asset Health Manager

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Asset Health Manager.

If you want to use Asset Health Manager with Process Data Integration and Policy Designer, you must also configure and start the services associated with these modules.

Supported Features in APM Now

In the APM Now environment, Process Data Integration functionality is not supported, and, as a result, OPC Tag functionality is also not supported. All other standard GE Digital APM product features for this module are available.

Asset Strategy Implementation (ASI) System Requirements

License Requirements

The following licenses are required to take full advantage of ASI functionality:

- Asset Strategy Management
- SAP Content for ASI

SAP System Requirements

The following SAP system versions are required to update items in SAP with changes made in ASI:

- **To create ASI/ASM objects in SAP and import ASI/ASM objects from SAP:** SAP ECC 6.0 - Enhancement Packs (EhP) 1 and above.
- **To update ASI/ASM objects in SAP:** SAP ECC 6.0 - Enhancement Packs (EhP) 5 and above.

Note: For supported SAP releases, see the SAP System Requirements section in APM Connect System Requirements.

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following additional components:

- **The Asset Strategy Management (ASM) module.** ASI allows you to build Implementation Packages, which are containers of records that dictate the work that you want to perform and the Asset Strategies that contain the original work requests (i.e., Action Revision records). Asset Strategies are created in ASM.
- **An SAP System.** The connectivity to SAP is required only if you want to create items such as Maintenance Plans, Maintenance Items, and Task Lists from ASI. To take full advantage of the ASI module, we recommend that you integrate ASI with SAP.

Deploying Asset Strategy Implementation

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Asset Strategy Implementation.

Supported Features in APM Now

This GE Digital APM module is not available in the APM Now environment.

Asset Strategy Management (ASM) System Requirements

License Requirements

A limited version of the ASM module is available with the Meridium Core license. To experience ASM with full functionality, an Asset Strategy Management license is required.

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following additional components if you wish to use Asset Strategy Implementation to manage actions that are implemented in an SAP system:

- The Asset Strategy Implementation (ASI) module. ASI allows you to build Implementation Packages, which are containers of records that dictate the work that you want to perform and the Asset Strategies that contain the original work requests.

Note: For supported SAP releases, see the SAP System Requirements section in APM Connect System Requirements.

Deploying Asset Strategy Management

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Asset Strategy Management.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Asset Strategy Optimization (ASO) System Requirements

License Requirements

The following licenses are required to take full advantage of ASO functionality:

- Asset Strategy Management
- Asset Strategy Optimization

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following additional components:

- The Asset Strategy Management (ASM) module: ASO allows you to optimize Asset Strategies by running data simulations on existing Asset Strategies. Asset Strategies are created in ASM.

Deploying Asset Strategy Optimization

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Asset Strategy Optimization.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Calibration Management System Requirements

License Requirements

The Calibration license is required to take advantage of the Calibration Management functionality.

Additional Components Required

If you use a documenting process calibrator or other calibration management software to perform automated calibration, then the machine that will connect to that calibrator must have the GE Digital APM Devices service installed.

These devices may require additional drivers provided by the manufacturer.

The following documenting process calibrator devices are supported:

- Fluke 74x Documenting Process Calibrator
- Fluke 75x Documenting Process Calibrator
- GE Druck Calibrators:

  - Druck DPI611 - Pressure Calibrator
  - Druck DPI612 - Flex Pressure Calibrator
  - Druck DPI620 - Multifunction Calibrator
  - Druck DPI620-IS - Intrinsically Safe Multifunction Calibrator
  - Druck DPI620G – Advanced Multifunction Calibrator, HART/Fieldbus Communicator
  - Druck DPI620G-IS - Intrinsically Safe Advanced Multifunction Calibrator, HART/Fieldbus Communicator

The following Calibration Management software is supported:

- CMX Calibration Management Software Version 2 (2.10.114.0)

To establish communication with the CMX Calibration Management software, in addition to GE Digital APM Device services, you must install the following software:

- Beamex Business Bridge (B3) Version 1 (1.2.0)

Deploying Calibration Management

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Calibration Managaement.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Compliance Management System Requirements

License Requirements

The Compliance Management, Inspection Management, and Policy Designer licenses are required to take advantage of the Compliance Management functionality.

Additional Components Required

You must ensure that the following licenses are active:

- Inspection Management
- Policy Designer

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

eLog System Requirements

License Requirements

The eLog license is required to take advantage of the eLog functionality.

Additional Components Required

If you want to create GAA Primary Events from eLog, you must ensure that the license for Generation Availability Analysis (GAA) is active.

Deploying eLog

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for eLog.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Failure Modes and Effects Analysis (FMEA) System Requirements

License Requirements

The RCM license is required to take advantage of FMEA functionality.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Failure Modes and Effects Analysis (FMEA)

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Failure Modes and Effects Analysis (FMEA).

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Family Policy System Requirements

License Requirements

The Family Policy license is required to take full advantage of Family Policy functionality.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Supported Features in APM Now

In the APM Now environment, certain input nodes (i.e., the AMS Asset, OPC Tag, and GE Tag nodes) are unavailable because the corresponding modules are not supported. In addition, the Rule node is supported only for rules that already exist in your database. All other standard GE Digital APM product features for this module are available.

Generation Availability Analysis (GAA) System Requirements

License Requirements

The Generation Availability Analysis license is required to take advantage of the Generation Availability Analysis functionality.

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following additional components:

- The GAA module utilizes R script functionality. Therefore, your system must also meet the system requirements for R scripts.
- If you want to access and create a Root Cause Analysis (RCA) from GAA, you must ensure that the license for Root Cause Analysis is active.
- If you want to access and create an eLog entry from GAA, you must ensure that the license for eLog is active.
- If you want to access the **Health Summary** page for an asset, you must ensure that the license for Asset Health Manager is active and that you have the appropriate Security User permissions.

Deploying Generation Availability Analysis

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Generation Availability Analysis.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Generation Availability Analysis Wind (GAA Wind) System Requirements

License Requirements

The GAA Wind license is required to take advantage of the GAA Wind functionality.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying GAA Wind

After you have installed and configured the basic system architecture, you will need to perform some configuration steps specifically for GAA Wind.

Supported Features in APM Now

All the standard GE Digital APM product features for this module are available in the APM Now environment.

Hazards Analysis System Requirements

License Requirements

The Hazards Analysis license is required to take advantage of the Hazards Analysis functionality. This license is also required to use the integration between Hazards Analysis and Layers of Protection Analysis (LOPA).

To use the integration between Hazards Analysis and SIS Management, the SIS Management license is also required.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Hazards Analysis

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Hazards Analysis.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Inspection Management System Requirements

License Requirements

The Inspection license is required to take advantage of Inspection Management functionality.

For organizations with sites located in Brazil, GE Digital APM provides expanded inspection functionality to support the inspection requirements of NR-13. To take advantage of this functionality, the NR13 license is required.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Inspection Management

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Inspection Management.

Supported Features in APM Now

In the APM Now environment, the following features are unavailable:

• EAM Work Management Integration

All other standard GE Digital APM product features for this module are available.

Life Cycle Cost Analysis System Requirements

License Requirements

The Life Cycle Cost Analysis (LCC) license is required to take advantage of the Life Cycle Cost Analysis functionality.

Additional Components Required

If you want to:

- Import Production Event costs from PLA, the license for Production Loss Analysis is required.

Deploying Life Cycle Cost Analysis

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Life Cycle Cost Analysis.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Layers of Protection Analysis (LOPA) System Requirements

License Requirements

The Hazards Analysis license is required to use the integration between LOPA and Hazards Analysis.

The SIS Management license is required to use the integration between LOPA and SIS Management.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Layers of Protection Analysis (LOPA)

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Layers of Protection Analysis (LOPA).

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Management of Change (MOC) System Requirements

License Requirements

The MOC license is required to take advantage of the Management of Change functionality.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Management of Change

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Management of Change.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Metrics and Scorecards System Requirements

License Requirements

The Metrics Manager license is required to use the Metrics and Scorecards module.

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following additional components:
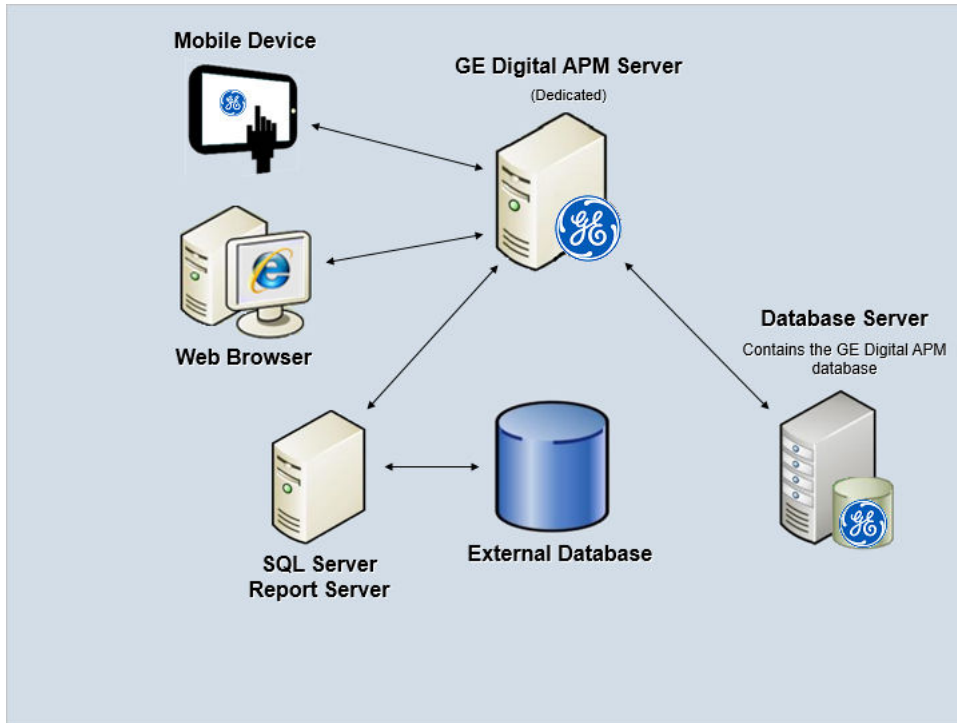
- A SQL Server Analysis Services Server machine that will host the Microsoft SQL Server Analysis Services software. The following versions of SQL Server Analysis Services are supported in this version of GE Digital APM:
  - Microsoft SQL Server Analysis Services 2014
  - Microsoft SQL Server Analysis Services 2016
- If you are using an Oracle database, to process the Work History cube, you must install ODP.NET (Oracle Data Provider.NET), an Oracle Data Access Component, on the machine where the Work History cube is deployed.

System Architecture

Microsoft SQL Server Analysis Services provides the ability to analyze large amounts of data quickly and easily. Analysis Services provides the means to access warehouses of data by letting you create dimensional cubes from information in the database and dimension tables. Numeric measures can be summed into pre-aggregated values while cubes are being created. Cubes can contain data that is summarized, copied, or read directly from the data warehouse. Cubes, dimensions, and partitions can be processed (that is, updated) to incorporate new or changed data from the data warehouse. Time, location, equipment type, or sizes are common dimensions against which measures are calculated and displayed in GE Digital APM. The data warehouse can be created as a separate database, combining information from GE Digital APM and other data sources. Alternatively, dimensional cubes can be created by accessing the GE Digital APM database directly.

Together, Microsoft SQL Server Analysis Services and the Metrics and Scorecards module functionality provide GE Digital APM users with the ability to analyze data in the GE Digital APM database using the features of Analysis Services through the GE Digital APM interface. To use the Metrics and Scorecards functionality, you must incorporate SQL Server Analysis Services into your GE Digital APM system.

If you choose to implement the Metrics and Scorecards module within your system, we recommend using a configuration in which the Analysis Server exists on a machine that is separate from the GE Digital APM Server. This deployment scenario most accurately reflects the GE Digital APM testing environment. The following illustration shows how the SQL Server Analysis Services Server connects to the basic GE Digital APM System architecture.

Note: While this image shows only a single, dedicated GE Digital APM Server, your implementation may contain one or more of these machines. The purpose of this image is to depict the interaction of the SQL Server Analysis Server with the basic GE Digital APM components, not to provide details on the basic components themselves. While your GE Digital APM system may contain multiple dedicatedGE Digital APM Servers, it will contain only a single SQL Server Analysis Server that all GE Digital APM Servers will access.

Deploying Metrics and Scorecards

After you have installed and configured the basic GE Digital APM system architecture, you need to perform some configuration steps specifically for Metrics and Scorecards.

Supported Features in APM Now

In the APM Now GE Digital APM environment, cube registration and modification features are unavailable. All other standard GE Digital APM product features for this module are available.

OT Connect System Requirements

License Requirements

The APM OT Connect license is required to take full advantage of the OT Connect functionality.

Note: If you are upgrading from a 4.x version which is running PDI to use OT Connect, you must also activate the OPC Interfaces licenses.

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following components:

- OT Connect Conductor service must be installed on the GE Digital APM Server.
- OT Connect Process Data Server: A machine on which the OPC compliant software is installed. The software requirements of this server are determined by the third-party distributor of the software. OT Connect Adapter must be installed on the OT Connect Process Data Server.
- Process Historian: A machine on which the process historian software is installed. The software requirements of this machine are determined by the third-party distributor of the software.

Important: OT Connect supports the OPC Foundation Historical Data Access (OPC-HDA) specification version 1.20. To support direct consumption of readings by Asset Health indicators and triggered policies, the server must implement the End aggregate or preferably use the OT Connect OPC DA Protocol Adapter for the Data Access data.

Refer to the supported software and devices documentation for information about OT Connect Process Data Servers and Process Historians that are tested for the OT Connect feature. The OT Connect Adapter can be installed and run on the OT Connect Process Data Server in OT Source Capability Utility mode to validate the capabilities of specific OT Connect Process Data Servers and process historians on a case-by-case basis. Refer to the deployment section for more information on the OT Connect Adapter.

System Architecture

The following image shows the basic system architecture for deploying OT Connect with one GE Digital APM Server.
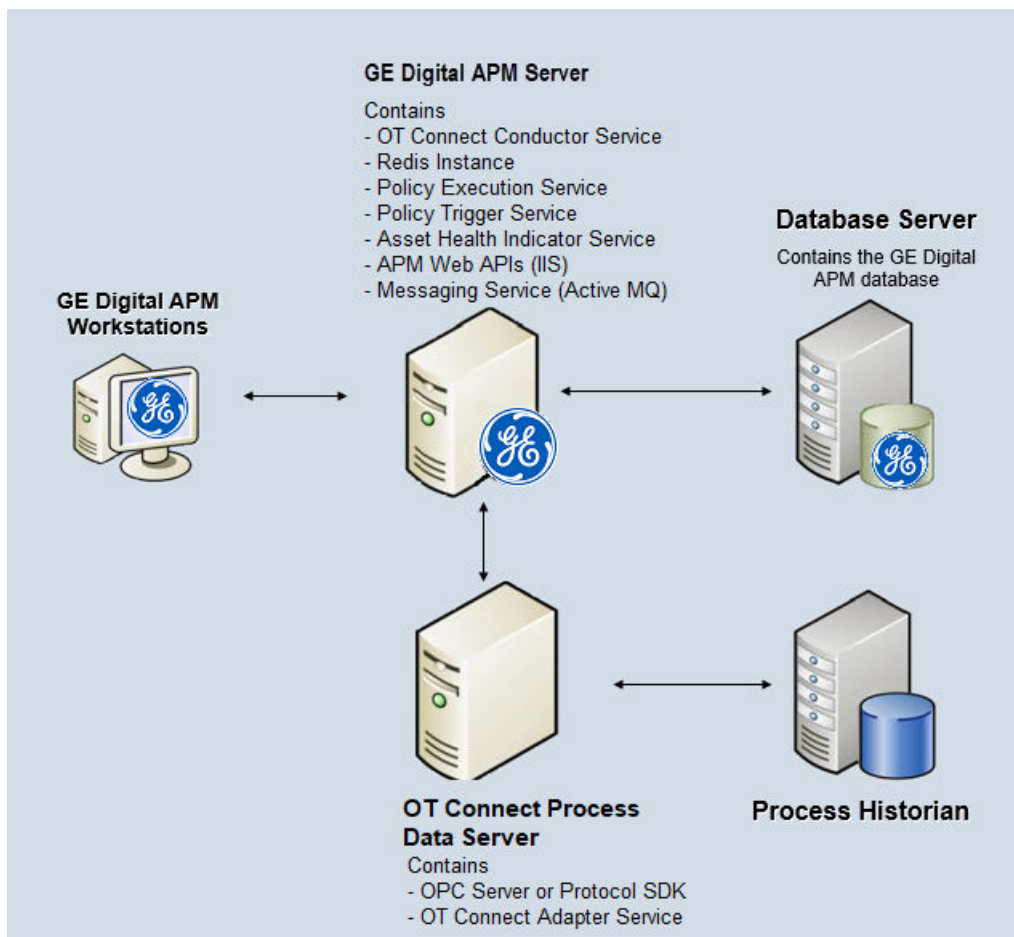
Deploying OT Connect

After you have installed and configured the basic GE Digital APM system architecture, you must perform some configuration steps specifically for OT Connect.

If you want to use OT Connect with Asset Health Manager and Policy Designer, you must also configure the services associated with these modules.

Supported Features in APM Now

This module is not available in the APM Now environment.

Policy Designer System Requirements

License Requirements

The Policy Designer license is required to take full advantage of Policy Designer functionality.

This license is not required for the module workflow policies to operate; however, if you want to modify a module workflow policy, the Policy Designer license is required. You do not need the Policy Designer license to view module workflow policies for modules for which you have a license.

Additional Components Required

When you install the GE Digital APM Server, the Policy Execution Service and Policy Trigger Service are installed automatically. In order to execute policies, you must configure these services on the appropriate machines.

Note: Depending on the number of policies that you need to manage in your system, you may have multiple GE Digital APM Servers to process policy executions. In this case, you can configure your GE Digital APM System Architecture according to your company's preference for server load-balancing.

Your system must also meet the system requirements for any additional modules that you plan to use with Policy Designer.

System Architecture

The following image shows the basic system architecture for deploying Policy Designer with one GE Digital APM Server that processes policy executions.
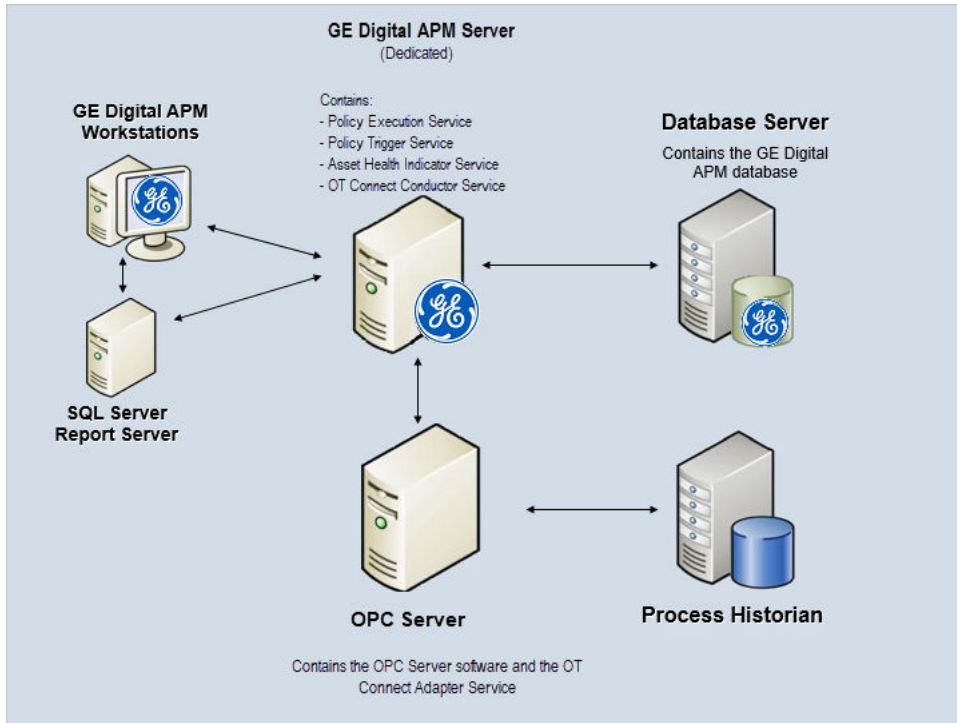
Deploying Policy Designer

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Policy Designer.

If you want to use Policy Designer with OT Connect and Asset Health Manager, you must also configure the services associated with these modules.

Supported Features in APM Now

In the APM Now environment, certain input nodes such as the AMS Asset, OT Connect Tag, and GE Tag nodes, are unavailable because the corresponding integration is not supported. In addition, the Rule node is supported only for rules implemented by GE Digital that already exist in your database. All other standard GE Digital APM product features for this module are available.

Production Loss Analysis (PLA) System Requirements

License Requirements

The Production Loss Accounting license is required to take advantage of PLA functionality.

If you want to:

- Access and create a Root Cause Analysis (RCA) from PLA, you will need to make sure that the license for Root Cause Analysis is active.
- Access and create a Production Analysis from PLA, you will need to make sure that the license for Reliability Analytics is active.

Deploying Production Loss Analysis

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Production Loss Analysis.

Supported Features in APM Now

In the APM Now environment, integration between PLA and Process Data Integration is unavailable. All other standard GE Digital APM product features for this module are available.

R Scripts System Requirements

License Requirements

This feature is available with the core GE Digital APM application; no specific license is required.

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following additional components:

- R Server: A machine on which the R Server software is installed. The software requirements of this server are determined by the third-party distributor of the software. You can find more information about this software, including required software dependencies and installation instructions, on the https://msdn.microsoft.com/en-us/microsoft-r/rserver-install-windows.

  The GE Digital APM testing environment uses DeployR Open 8.0.0, DeployR Enterprise 8.0.0, and Machine Learning Server 9.2.1.

  Note: The World Wide Web Publishing service must be enabled on the R Server or Machine Learning Server in order to use R scripts in GE Digital APM. If this setting is disabled during the installation of R Server, you must enable it.

Deploying R Scripts

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for R Scripts.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

RBI 581 System Requirements

License Requirements

The RBI 581 license is required to take advantage of RBI 581 functionality.

Note:

Because the RBI 581 and RBI modules share the same user interface, if you only have the RBI 581 license, various features normally available with the Risk Based Inspection license will be disabled. The following list indicates which features normally available with Risk Based Inspection are disabled.

If you only have the RBI 581 license:

- An RBI 580 license is required to use RBI Criticality Analyses, RBI Pipeline Analyses, and RBI PRD Criticality Analyses.
- On the **Risk Based Inspection Overview** page:
  - **Generate Recommendations** is disabled.
  - The **Current Risk Overview** and **Past Risk Overview** charts will plot the risk ranks for RBI 580 Criticality Analyses, RBI PRD Criticality Analyses, and RBI Pipeline Analyses.
  - The **Current Risk** and **Past Risk** widgets will list RBI 580 Criticality Analyses, RBI PRD Criticality Analyses, and RBI Pipeline Analyses.
- In the **Asset Summary** workspace:
  - The Asset Summary and Asset Risk Reports are disabled.

Additional Components Required

The RBI 581 module utilizes the R script functionality. Therefore, your system must also meet the system requirements for R scripts.

Deploying RBI 581

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for RBI 581.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Recommendation Management System Requirements

License Requirements

The Meridium Core license is required to take advantage of the Recommendation Management functionality.

Supported Features in APM Now

In the APM Now environment, generating EAM Requests from recommendations is available only if you are using SAP as your EAM system. All other standard GE Digital APM product features for this module are available.

Reference Documents System Requirements

License Requirements

This feature is available with the core GE Digital APM application; no specific license is required.

Supported Features in APM Now

In the APM Now environment, external Reference Document access is unavailable. All other standard GE Digital APM product features related to Reference Documents are available.

Risk Based Inspection (RBI) System Requirements

License Requirements

The Risk Based Inspection license is required to take advantage of RBI functionality.

Important: If you want to configure the RBI 580 calculations, the Policy Designer license is also required.

Note:

Because the RBI 581 and RBI modules share the same user interface, if you have only the Risk Based Inspection license, various features normally available with the RBI 581 license will be disabled. Specifically:

- An RBI 581 license is required to use RBI 581 Risk Analyses.
- The RBI 581 ISO Risk Plot feature is not available.
- On the **RBI Admin Preferences** page, the **RBI 581 Admin Options**, **RBI 581 ISO-Risk Plot Preferences**, **Inspection Auto-Selection**, and **RBI 581 Inventory Groups** workspaces are not available.

Additional License

- If you are planning to use Flexible RBI Methodology, the Policy Designer license is also required.
- If you want to take advantage of the extended RBI functionality for pipelines, the Pipeline Management license is also required.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Risk Based Inspection

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Risk Based Inspection.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Root Cause Analysis (RCA) System Requirements

License Requirements

The PROACT license is required to take advantage of RCA functionality.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Root Cause Analysis

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Root Cause Analysis.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Rounds System Requirements

System Requirements

The Operator Rounds license and the Lubrication Management license are required to take advantage of the Rounds functionality (i.e., Rounds Designer and Rounds Data Collection modules).

Additional Components Required

Refer to the supported software and devices documentation for information about the software and hardware requirements for devices you can use for data collection in Rounds.

Supported Features in APM Now

The standard GE Digital APM product features for this module are available online in a browser.

Reliability Analytics System Requirements

License Requirements

The Reliability Manager license is required to take advantage of Reliability Analytics functionality.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Reliability Analytics

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Reliability Analytics.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Reliability Centered Maintenance (RCM) System Requirements

License Requirements

The RCM license is required to take advantage of RCM functionality.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying Reliability Centered Maintenance

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Reliability Centered Maintenance.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Reports System Requirements

License Requirements

This feature is available with the core GE Digital APM application; no specific license is required.

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following additional components:

- Microsoft Visual Studio 2017 Professional and Microsoft SQL Server Data Tools - Business Intelligence for Microsoft Visual Studio 2017 (15.8.0).

    or

    Microsoft Visual Studio 2019 Professional and Microsoft SQL Server Data Tools - Business Intelligence for Microsoft Visual Studio 2019.

    Note: If you install SSDT for Microsoft Visual Studio 2019, install Microsoft Reporting Service Projects (VSIX 2.6.2). For more information on how to install Microsoft Reporting Services Projects (VSIX 2.6.2), refer to the Microsoft SSDT documentation.

- APM SSRS Data Processing Extension plugin for Visual Studio from the Admin Installer.

Deploying Reports

After you have installed and configured the basic GE Digital APM system architecture, configure Reports.

Supported Features in APM Now

In the APM Now environment, SSRS report creation and modification features are unavailable. All other standard GE Digital APM product features for this module are available.

Rules System Requirements

License Requirements

A Developers License is required to use Rules Editor.

Additional Components Required

In addition to the basic GE Digital APM system architecture, your system must also contain the following additional components:

- Microsoft Visual Studio 2017 or 2019 Professional must be installed on every workstation where you want to work with GE Digital APM rules in the GE Digital APM system.
- GE Digital APM Rules Editor Extension plugin for Visual Studio from the Admin Installer.

Deploying Rules

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Rules.

Supported Features in APM Now

This GE Digital APM module is not available in the APM Now environment.

SIS Management System Requirements

License Requirements

The SIS Management license is required to take advantage of the SIS Management functionality. This license is also required to use the integration between SIS Management and Layers of Protection Analysis (LOPA).

To use the integration between SIS Management and Hazards Analysis, the Hazards Analysis license is also required.

Additional Components Required

Only the basic GE Digital APM system architecture is required for this feature to work correctly. No additional components are required.

Deploying SIS Management

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for SIS Management.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Supported Safety Equipment Reliability Handbook (SERH) version in APM Now

The following table provides the SERH version supported in each APM Now release.

APM Now Version	SERH Version
V4.3.0.7.0 or later	2017.4.01
V4.1.5.0.0 or later	2015.3.01
V4.1.0.0.0 or later	2015.2.01

APM Now Version	SERH Version
V4.0.0.0.0 or later	2014.2.01
V3.6.0.11.3 or later	2012.4.01

Thickness Monitoring (TM) System Requirements

License Requirements

The Thickness Monitoring license is required to take advantage of TM functionality.

Additional Components Required

In addition to Thickness Monitoring, if you will use devices to collect data that you will transfer to GE Digital APM, the machine that will connect to these devices must have the GE Digital APM Device Service installed. The following devices are supported:

- GE DMS Go
- GE DMS Go+
- GE DMS2
- Olympus (Panametrics) 37DL Plus Ultrasonic Thickness Gage
- Olympus (Panametrics) 38DL Plus Ultrasonic Thickness Gage

These devices may require additional drivers provided by the manufacturer.

Deploying Thickness Monitoring

After you have installed and configured the basic GE Digital APM system architecture, you will need to perform some configuration steps specifically for Thickness Monitoring.

Supported Features in APM Now

All standard GE Digital APM product features for this module are available in the APM Now environment.

Chapter

3

Administrative Features

Topics:

About Administrative Feature Access in APM Now

The Administrative User Help documentation contains information about features that are not available in APM Now. Only the features listed in this topic are available in APM Now.

Tip: For more information about the subset of administrative features to which the users associated with the MI APM Now Admin Security Role are granted access, refer to the Security Manager documentation.

Application Settings

- Asset Criticality Analysis
- Performance Monitoring
- Rounds Designer

Configuration Manager

- Family Management

    Note: You cannot create or delete families and family fields in APM Now.
- System Codes and Tables
- Units of Measure and Conversions
- Import and Export
- Content Validation
- Sites

Operations Manager

- Activate Licenses
- APM Connect EAM Jobs
- Asset Hierarchy Configuration
- Connections
- Data Sources
- Host Names
- Email Settings
- GIS Configuration
- Monitoring
- Query Timeouts
- Reference Document Server Credentials
- Risk Matrix
- Schedule Logs
- Search Configuration
- SQL Server Reporting Services
- APM System Monitoring
- Systems and Tags

Security Manager

- Users
- Groups
- Roles

- Password Policy
- Lightweight Directory Access Protocol (LDAP)
- Data Permissions
- User Defaults

About Access to Configuration Manager Features

You need a Developers license to perform the following functions:

- Adding or deleting an **Entity** family on the **Family Management** page.
- Adding an **Entity** family by using the Import tool.
- Adding or deleting **Fields** via the **Family Management** page.
- Adding family Fields by using the Import tool.
- Adding, editing, or deleting Relationship families via the **Family Management** page.
- Adding or editing Relationship families by using the Import tool.
- Adding, editing, or deleting Relationship Definitions via **Family Management** page.
- Adding or editing Relationship Definitions by using the Import tool.
- Adding, editing, or deleting VB Rules by using Rules Editor.

The following table lists the permissions granted to the MI Configuration Role Security Group for accessing the various administrative features of Configuration Manager.

Feature	Permission	Notes
Security Group: MI Configuration Role		
Entity Family	Add, Edit, or Delete	None
Fields	Add, Edit, Delete	None
Field Behavior	Add, Edit, or Delete	None
Relationship Family	Add, Edit, or Delete	None
Relationship Definitions	Add, Edit, Delete	None
Datasheet	Add, Edit, or Delete	None
State Configuration	Add, Edit, or Delete	None
Family Reports (Associate SSRS Reports)	Add, Edit, or Delete	None
Associated Pages	Add, Edit, or Delete	None
Family Policies	Add, Edit, or Delete	None
Sites	Add, Edit, or Delete	None
System Codes and Tables	Add, Edit, or Delete	None
Units of Measure and Conversions	Add, Edit, or Delete	None
Manage Translations	None	There is no add, edit, or delete function that you can perform in this feature. However, if you are a part of this group, then you can perform all of the translation tasks.

Feature	Permission	Notes
Security Group: MI Configuration Role		
Import	None	There is no add, edit, or delete function that you can perform in this feature. However, you can import all metadata if you are part of this group.
Export	None	There is no add, edit, or delete function that you can perform in this feature. However, you can export metadata if you are part of this group.
Content Change Management	None	There is no add, edit, or delete function that you can perform in this feature.
Content Validation	None	There is no add, edit, or delete function that you can perform in this feature.

Chapter

4

Support

Topics:

- Customer Support

Customer Support

To contact support, go to: http://www.ge.com/digital/support.