



GE Digital

GE Digital APM System Requirements

V4.3.0.5.0

GE Digital APM System Requirements

V4.3.0.5.0

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About This Document

This file is provided so that you can easily print this section of the GE Digital APM Help system.

You should, however, use the Help system instead of a printed document. This is because the Help system provides hyperlinks that will assist you in easily locating the related instructions that you need. Such links are not available in a print document format.

The GE Digital APM Help system can be accessed within GE Digital APM itself or via the GE Digital APM Documentation Website (<https://www.meridium.com/secure/documentation/WebHelp/Home.htm>).

Note: If you do not have access to the GE Digital APM Documentation Website, contact GE Global Support (<https://www.ge.com/digital/asset-performance-management>).

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Basic GE Digital APM 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

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
<p>Minimum requirements for full-resolution view mode:</p> <ul style="list-style-type: none"> • Two Processor Cores, 2 GHz • 2 GB RAM • 8 GB of available hard drive space • 7" screen • 1920 X 1200 screen resolution 	<p>Devices used in the GE Digital testing environment:</p> <ul style="list-style-type: none"> • 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	Devices Tested
<p>Minimum requirements for limited-resolution view mode:</p> <ul style="list-style-type: none"> • Two Processor Cores, 1 GHz • 1 GB RAM • 8 GB of available hard drive space • 4" screen • 1024 X 600 screen resolution 	<p>Devices used in the GE Digital testing environment:</p> <ul style="list-style-type: none"> • 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
<p>Minimum requirements:</p> <ul style="list-style-type: none"> • 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) 	<p>Devices used in the GE Digital testing environment:</p> <ul style="list-style-type: none"> • 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.

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

- Chrome 43 or higher

Note: 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).

Desktops and Laptops

One of the following operating systems is required for desktops and laptops:

- Apple OS X Yosemite
- Windows 7 (32-bit)
- Windows 7 (64-bit)
- Windows 8.1 (64-bit)
- Windows 10 (64-bit)

Mobile Devices and Small Screen Devices

One of the following operating systems is required for mobile devices:

- Android Kitkat 4.4
- Android Lollipop 5.0
- Android Marshmallow 6.0
- Apple iOS 8
- Windows 8.1 (64-bit)
- 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 machine 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.

- Four Processor Cores, 2+ GHz
- 16 GB RAM

Note: If you will install Elastic Search on the GE Digital APM Server, to improve system performance, GE Digital recommends that the server machine have a minimum of 24 GB RAM.

- 100 GB of available hard drive space on, at a minimum, 7.2K RPM drives

A minimum of a 100BASE-TX switched network is required between the GE Digital APM Server and the Database Server.

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 have its own dedicated processor cores and memory allocation to ensure appropriate performance.

GE Digital 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

Software 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 2012 R2 (64-bit) or 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.

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	Oracle Corporation	Yes	If this is not found, an error message will appear.
Microsoft Access Database Engine (ACE) 2010	GE Digital APM distribution package	Yes	<p>The installer does not check for this component.</p> <p>Microsoft Database Access (ACE) is required on the GE Digital APM Server if you have translations stored in your database and want those translations to be exported during the database upgrade process.</p> <p>The Microsoft ACE software is stored in the following location in the GE Digital APM distribution package: Required 3rd Party Components\Microsoft ACE\12.0.</p> <p>To install this component, open the file AccessDatabaseEngine_x64.exe.</p>

Software Name and Version	Where You Can Obtain It	Required?	Behavior of GE Digital APM Server and Add-ons Installer
Microsoft ADOMD.Net	Microsoft	Yes, if Rounds will be installed.	If this is not found, the installation will continue.
Microsoft Message Queuing (MSMQ)	Microsoft	Yes	If this is not found, you can continue through the installation process. This service can be activated through roles in the Server Manager.
Microsoft SQL Server 2012 Management Objects	Microsoft	Yes	If this is not found, the installer will install it automatically.
Microsoft Visual C++ 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.
SQL Server Data Tools (SSDT) (if you are using SQL Server Reporting Services 2012)	Microsoft	Yes, if you want to design reports on that machine. Otherwise, this is not required.	None
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.

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.

- Four 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 supports the use of RAID 5, which has benefits in its recoverability features, GE Digital *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 2012, SQL Server 2014, or SQL Server 2016. If you are using SQL Server 2012, it must be SP3 or above. The GE Digital testing environment uses SQL Server 2012 Standard Edition SP3, SQL Server 2014 Standard Edition RTM and SP2, and SQL Server 2016 SP1.

IMPORTANT: GE Digital does not support any modifications made to database tables directly or via third-party tools. Do not write data directly into or change data in database tables through any third-party tool.

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 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 Professional Services department.

Software Requirements

The following software components are required on the 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 2012 -or- 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 requirements outline the *minimum* hardware required for SQL Server Analysis Services support in APM Metrics and Scorecards module. These requirements account for the GE Digital APM software only. Additional hardware may be required on a SQL Server Analysis Services 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

Software Requirements

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

Software Name and Version	Where You Can Obtain It	Required?
SQL Server Reporting Services 2012 (Multi-Dimensional mode only)	Microsoft	Yes
-or-		
SQL Server Reporting Services 2014 (Multi-Dimensional mode only)		

GE Digital APM Supported Software and Devices

The following tables describe the software and devices supported by GE Digital APM.

Supported Software

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
All GE Digital APM Components	.NET Framework 4.5	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	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
ASI for SAP	SAP ECC 6.0 (Enhancement Packs [EhP] 1 through 8)	<p>The following SAP system versions are required to update items in SAP with changes made in ASI:</p> <ul style="list-style-type: none"> • To create ASI/ASM objects in SAP and import ASI/ASM objects from SAP: SAP ECC 6.0-Enhancement Packs (EhP) 1-8. 						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
		<ul style="list-style-type: none"> To update ASI/ASM objects in SAP: SAP ECC 6.0-Enhancement Packs (EhP) 5-8. 						
	S/4 Hana	None						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
Calibration Management	CMX Calibration Management Software Version 2 (2.10.11-4.0)	The following software must be installed to establish communication with the CMX Calibration Management software: <ul style="list-style-type: none"> • Beamex Business Bridge (B3) Version 1 (1.2.-0) We do not recommend using Virtual Machines for Calibration Management.						
	GE Device Driver 1.6.0.0	None						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
GE Analytics	Enterprise Impact V17.1 SP 1	None						
	RabbitMQ server V3.5.3 and above	None						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
GE Digital APM Client Operating System	Android Kitkat 4.4	None						
	Android Lollipop 5.0	None						
	Android Marshmallow 6.0	None						
	Apple iOS 8	None						
	Apple iOS 9	None						
	Apple OS X	None						
	Windows 7 (32-bit and 64-bit)	Applies to desktops and laptops.						
	Windows 8.1 (64-bit)	Applies to desktops, laptops, and mobile devices.						
	Windows 10 (64-bit)	Applies to desktops, laptops, and mobile devices.						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
GE Digital APM Client Web Browser	Chrome 43 and higher	None						
	Internet Explorer 11	None						
	Microsoft Edge	None						
	Safari 8 (Mac only)	None						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
GE Digital APM Database	The Enterprise Edition or Standard Edition of Oracle Server 12.1. Oracle Multimedia	The GE Digital APM testing environment uses Oracle Server 12.1.0.1 and 12.1.0.2.						
	The Enterprise Edition or Standard Edition of Oracle Server 12.2. Oracle Multimedia	The GE Digital APM testing environment uses Oracle Server 12.2.0.1.0.						
	SQL Server 2012 (SP3 or higher)	The GE Digital testing environment uses SQL Server 2012 Standard Edition SP3.						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
	SQL Server 2014	The GE Digital testing environment uses SQL Server 2014 Standard Edition RTM and SP2.						
	SQL Server 2016	The GE Digital testing environment uses SQL Server 2016 SP1.						
GE Digital APM Servers	Windows Server 2012 R2 (64-bit)	None						
	Windows Server 2016 Version 1607	None						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
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	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
Process Data Integration	OSIsoft-® PI Server version 3.4.390.-16 with PI OPC DA/HD-A Server version 1.2.7.0.	None						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
	Matrikon Simulation tool, which simulates the MatrikonOPC Historical Data Access Suite	Tag browsing must be enabled on the machine on which the Honeywell Uni- formance® 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 Uni- formance® PHD OPC Server User Guide.						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
	IP21 (Aspen ONE V8.0) Version 12.0.0.2-0	A direct connection to IP21 provides access to DA values only.						
	IP21 (Aspen ONE V8.0) Version 12.0.0.2-0 with Mat-rikonOP-C IP21 Server Version 2.3.1.53-22	None						
	Honeywell Uni-formance® Process History Database (PHD) Version 310.1.0.	None						
	GE Historian 7.0 SP1	GE Historian provides access to HDA values only.						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
	GE Cimplicity V9.5	GE Cimplicity provides access to DA values only.						
R Scripts	DeployR-Open and DeployR Enterprise	The GE Digital testing environment uses DeployR Open 8.0.0 and DeployR Enterprise 8.0.0.						
Reports	Microsoft Visual Studio 2013 Professional	None						
	Microsoft SQL Server Data Tools - Business Intelligence for Visual Studio 2013	None						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
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						
Rules	Microsoft Visual Studio 2013 Professional	None						
	MSXML	None						

GE Digital APM Components	Supported Third Party Components	Notes	V4.3.-0.0.0	V4.3.-0.1.0	V4.3.-0.2.0	V4.3.-0.3.0	V4.3.-0.4.0	V4.3.-0.5.0
SAP Interfaces	SAP ECC 6.0 (Enhancement Packs [EhP] 1 through 8)	None						
	S/4 Hana	None						
Search	Elastic-search 5.3.0	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	V4.3-.0.0.-0	V4.3-.0.1.-0	V4.3-.0.2.-0	V4.3-.0.3.-0	V4.3-.0.4.-0	V4.3-.0.5.-0
Calibration Management*	Fluke 74x Documenting Process Calibrator	None						
	Fluke 75x Documenting Process Calibrator	None						

GE Digital APM Components	Device	Notes	V4.3-.0.0-0	V4.3-.0.1-0	V4.3-.0.2-0	V4.3-.0.3-0	V4.3-.0.4-0	V4.3-.0.5-0
	GE Druck Calibrators: <ul style="list-style-type: none"> • Druck DPI6-11 - Pressure Calibrator • Druck DPI6-12 - Flex Pressure Calibrator • Druck DPI6-20 - Multifunction Calibrator • Druck DPI6-20-IS - Intrinsically Safe Multifunction Calibrator 	None						

GE Digital APM Components	Device	Notes	V4.3-.0.0.-0	V4.3-.0.1.-0	V4.3-.0.2.-0	V4.3-.0.3.-0	V4.3-.0.4.-0	V4.3-.0.5.-0
<ul style="list-style-type: none"> • Druck DPI61-1 - Pressure Calibrator • Druck DPI61-2 - Flex Pressure Calibrator • Druck DPI62-0 - Multifunction Calibrator • Druck DPI62-0-IS - Intrinsically Safe Multifunction Calibrator • Druck DPI62-0G - 	<ul style="list-style-type: none"> • Druck DPI6-20G - Advanced Multifunction Calibrator, HART/Fieldbus Communicator • Druck DPI6-20G-IS - Intrinsically Safe Advanced Multifunction Calibrator, HART/Fieldbus Communicator 							

Advanced Multifunction Calibrator, HART/Fieldbus Communicator

GE Digital APM Components	Device	Notes	V4.3-.0.0-0	V4.3-.0.1-0	V4.3-.0.2-0	V4.3-.0.3-0	V4.3-.0.4-0	V4.3-.0.5-0
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								

GE Digital APM Components	Device	Notes	V4.3-.0.0.-0	V4.3-.0.1.-0	V4.3-.0.2.-0	V4.3-.0.3.-0	V4.3-.0.4.-0	V4.3-.0.5.-0
	Device cameras for Android, iOS, and Windows tablets	This feature is available only when using the GE Digital APM mobile application.						

GE Digital APM Components	Device	Notes	V4.3-.0.0-0	V4.3-.0.1-0	V4.3-.0.2-0	V4.3-.0.3-0	V4.3-.0.4-0	V4.3-.0.5-0
	Intermec and Motorola scanners	<p>Devices used in the GE Digital APM testing environment:</p> <ul style="list-style-type: none"> • Intermec CN-70 device • Motorola MC-950-0-K Series device • Zebra (previously Motorola Psion) Omnii XT1-5 with 1D barcode 						

GE Digital APM Components	Device	Notes	V4.3-.0.0.-0	V4.3-.0.1.-0	V4.3-.0.2.-0	V4.3-.0.3.-0	V4.3-.0.4.-0	V4.3-.0.5.-0
	<ul style="list-style-type: none"> Intermec CN70 device Motorola MC9500-K Series device Zebra (previously Motorola Psion) Omnii XT15 with 1D barcode reader <p>Only Code 39 barcodes are supported.</p>	reader						
RFID Functionality								

GE Digital APM Components	Device	Notes	V4.3-.0.0-0	V4.3-.0.1-0	V4.3-.0.2-0	V4.3-.0.3-0	V4.3-.0.4-0	V4.3-.0.5-0
Intermec 70 Series scanners with the Intermec IP30 Hand-held RFID reader	<p>Device used in the GE Digital APM testing environment:</p> <ul style="list-style-type: none"> Intermec CN70 device with an Intermec IP30 Hand-held RFID reader <p>The following RFID Types are supported:</p> <ul style="list-style-type: none"> International Standards Organization 1800-0-6B Generation 2 Electronic Produ- 							

GE Digital APM Components	Device	Notes	V4.3-.0.0.-0	V4.3-.0.1.-0	V4.3-.0.2.-0	V4.3-.0.3.-0	V4.3-.0.4.-0	V4.3-.0.5.-0
	ct Code Global Class 1, Gen- era- tion 2							

GE Digital APM Components	Device	Notes	V4.3-.0.0-0	V4.3-.0.1-0	V4.3-.0.2-0	V4.3-.0.3-0	V4.3-.0.4-0	V4.3-.0.5-0
eco- m/Intermec i.roc Ci70 - Ex handheld device with LF or HF RFID reader	Device used in the GE Digital APM testing envir- onment: <ul style="list-style-type: none"> • i.roc Ci70- Ex devic- e with eCom LF RFID reade- r (TLB3- 0) • i.roc Ci70- Ex devic- e with eCom HF RFID reade- r (UN1- 13) The fol- lowing RFID Types are supported: <ul style="list-style-type: none"> • Inter- nation- al Stand- ards Organ- 							

GE Digital APM Components	Device	Notes	V4.3-.0.0-0	V4.3-.0.1-0	V4.3-.0.2-0	V4.3-.0.3-0	V4.3-.0.4-0	V4.3-.0.5-0
	ization 1800-0-6B Generation 2 • Electronic Product Code Global Class 1, Generation 2							

GE Digital APM Components	Device	Notes	V4.3-.0.0-0	V4.3-.0.1-0	V4.3-.0.2-0	V4.3-.0.3-0	V4.3-.0.4-0	V4.3-.0.5-0
Thickness Monitoring*	GE DMS Go	This device is not compatible with the Microsoft Edge browser.						
	GE DMS Go+	This device is not compatible with the Microsoft Edge browser.						
	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 supports.

Supported Languages for Translation

License Requirements

Each language for translation available in the GE Digital 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

Deploying Translations

To activate licenses for language translation, consult the [Activate Licenses](#) section of the documentation.

AMS Analytics System Requirements

License Requirements

The AMS Analytics license is required to take advantage of the AMS Analytics functionality.

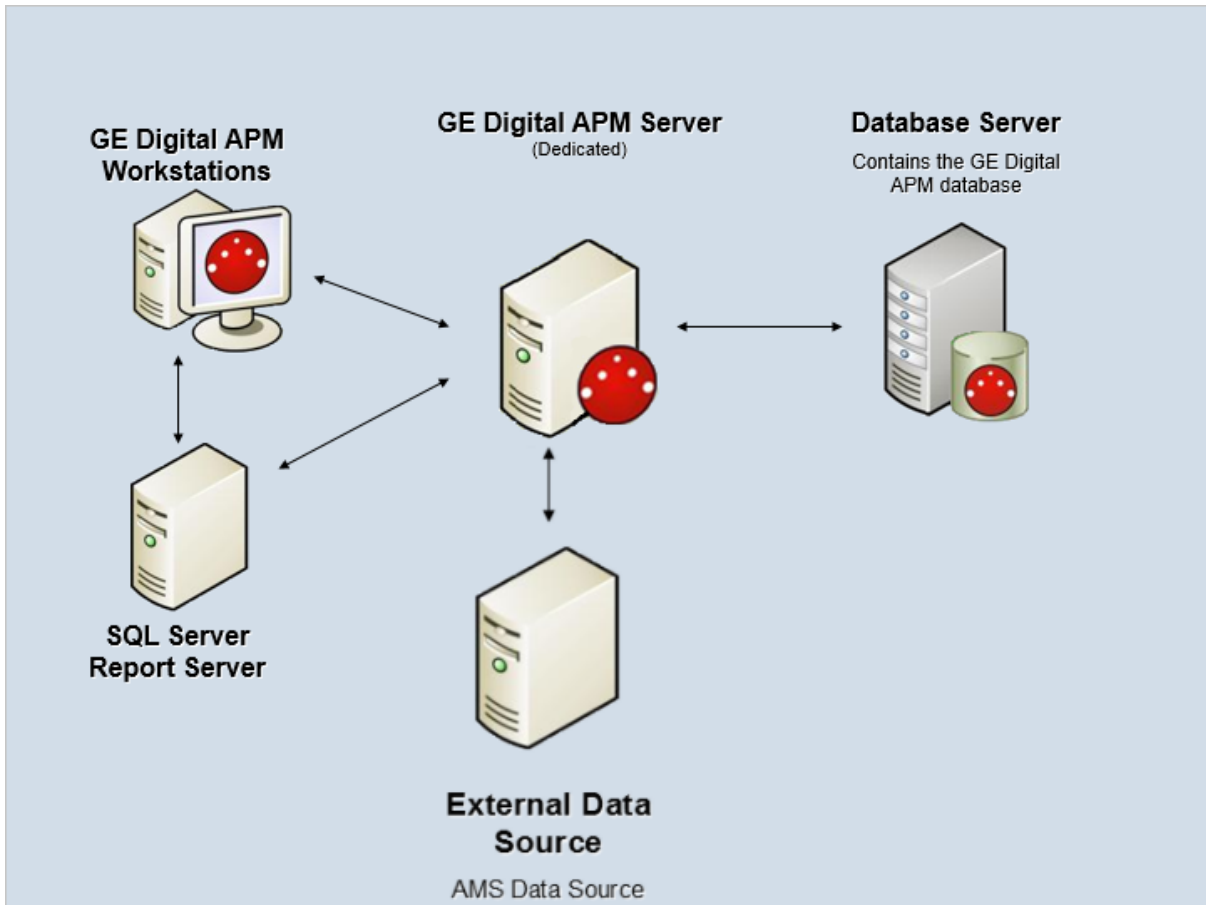
Additional Components Required

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

- AMS Intelligent Device Manager V13, which is a third-party component and exceeds the scope of this documentation

System Architecture

The following image shows how the additional components should be incorporated into the basic GE Digital APM system architecture to support this module.



Deploying AMS Analytics

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

Supported Features in APM Now

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

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 Professional Services department on an individual basis. Specific requirements of third-party products, such as additional licensing, 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.

Additional Components Required

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

- Java SE 8 Update 131 or higher
- The third-party components listed in the following table

Third-Party File Name	Version	Where You Can Obtain It
edtftpj.jar	Version: 2.0.5	http://enterprisedt.com/products/edtftpj/
ftp4j-1.5.1.jar	Version: 1.5.1	http://www.sauronsoftware.it/projects/ftp4j/
jboss-serialization.jar	Version: 1.0.3.GA	http://serialization.jboss.org/downloads
trove.jar	Version: 1.0.2	http://trove4j.sourceforge.net/
xom-1.2.7.jar	Version: 1.2.7	http://www.xom.nu/

Recommended Software

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

Browser Requirements

Web Browser	Recommended or Supported
Microsoft Internet Explorer 11	Recommended
Mozilla Firefox 13 to 28	Recommended
Microsoft Internet Explorer 10	Supported
Apple Safari 5 to 7	Supported
Google Chrome 22 to 34	Supported

Minimum Hardware Requirements

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

Recommended Hardware

- 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 lot of storage space. Faster storage is the best way to improve performance.

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.

SAP System Requirements

- **SAP Backend System:** The following versions are supported:
 - SAP ECC 6.0 (Enhancement Packs [EhP] 1 and above)
 - S/4 Hana (1511, 1610, and 1709) for the following APM Connect SAP Adapters:
 - Equipment Extraction
 - Functional Location Extraction
 - Notification Management
 - Technical Characteristics
 - Work History Extraction
 - Work Management
- **SAP Database:** A database that contains the SAP data model and data.
- **SAP Internet Transaction Server (ITS):** Version 6.20 or higher.
- SAP Java Connector Files (SAP JCO) downloaded from the SAP marketplace, which contains the following files:
 - sapjco.dll
 - sapjco3.dll
 - sapjco3.jar

SAP PI System Requirements

- **SAP Backend System:** The following versions are supported:
 - SAP ECC 6.0 (Enhancement Packs [EhP] 1 and above)
 - S/4 Hana (1511, 1610, and 1709) for the following APM Connect SAP Adapters:
 - Equipment Extraction
 - Functional Location Extraction
 - Notification Management
 - Technical Characteristics

- Work History Extraction
- Work Management
- **SAP PI:** An SAP PI system 7.00 and above, up to SAP PI 7.50.
- An SAP PO system 7.50 and later.

Maximo System Requirements

APM Connect supports Maximo versions above 7.1.1.6.

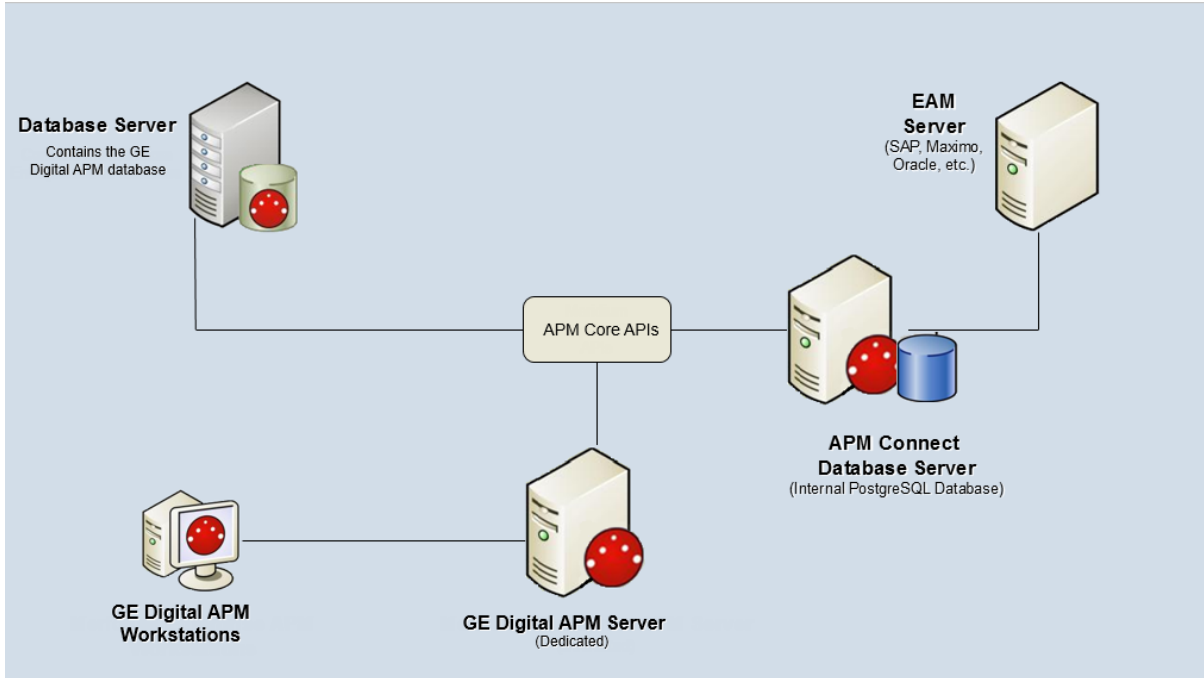
- **Maximo Application Server:** A Maximo Application Server machine that houses the Maximo Web Services and is running version 7.1, 7.5, or 7.6.
- **Maximo Database Server:** A database that houses the Maximo data model and data and is running a version that is supported by the Maximo Application Server. For details on requirements of the Maximo Database Server, see the Maximo documentation.
- **Maximo Client Workstation:** A computer that is used to access the Maximo application. For details on the requirements of the Maximo Client workstation, see the Maximo documentation.
- **Maximo Administrative Workstation:** A computer that contains the Maximo application. For details on the requirements of the Maximo Administrative workstation, see the Maximo documentation.

System Architecture for EAM Adapters

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.

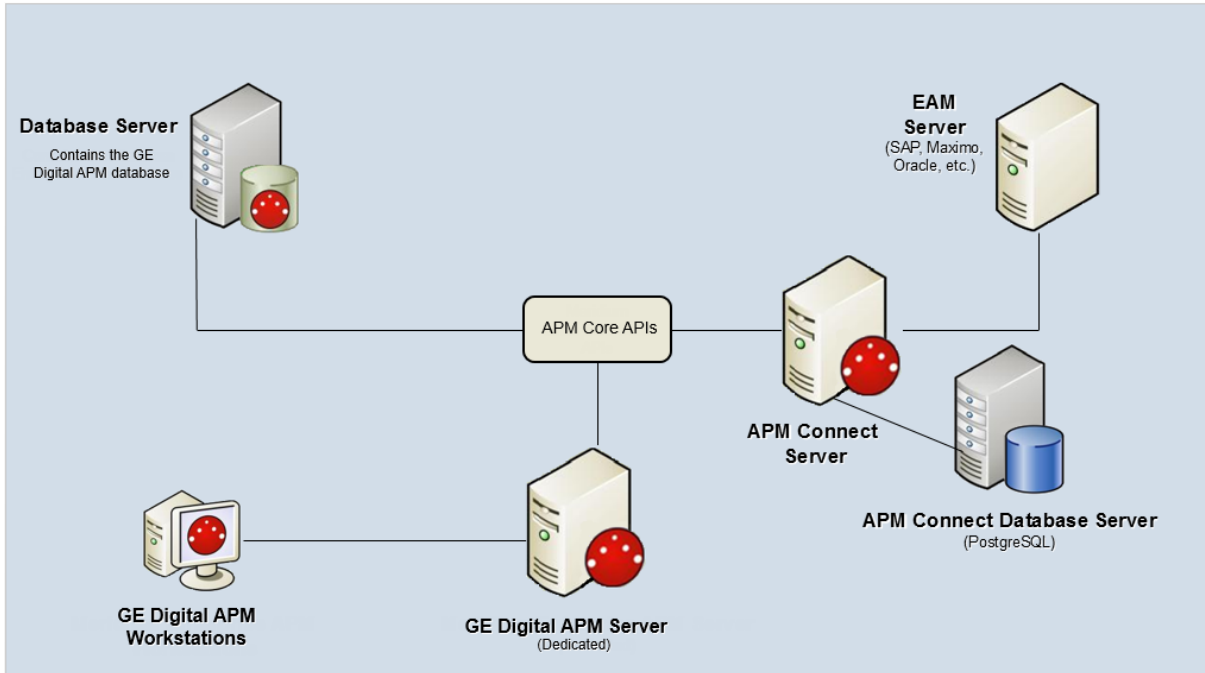
Note: Only one EAM system is supported for each APM tenant or database.



External Database Configuration

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.



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

All 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.

APM System Monitoring

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, the following additional components are required:

- The latest version of MongoDB Community Edition. The latest version of MongoDB Community Edition, as well as instructions about how to install it, can be found on the official MongoDB, Inc. website.

Deploying APM System Monitoring

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

Supported Features in APM Now

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

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

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

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.

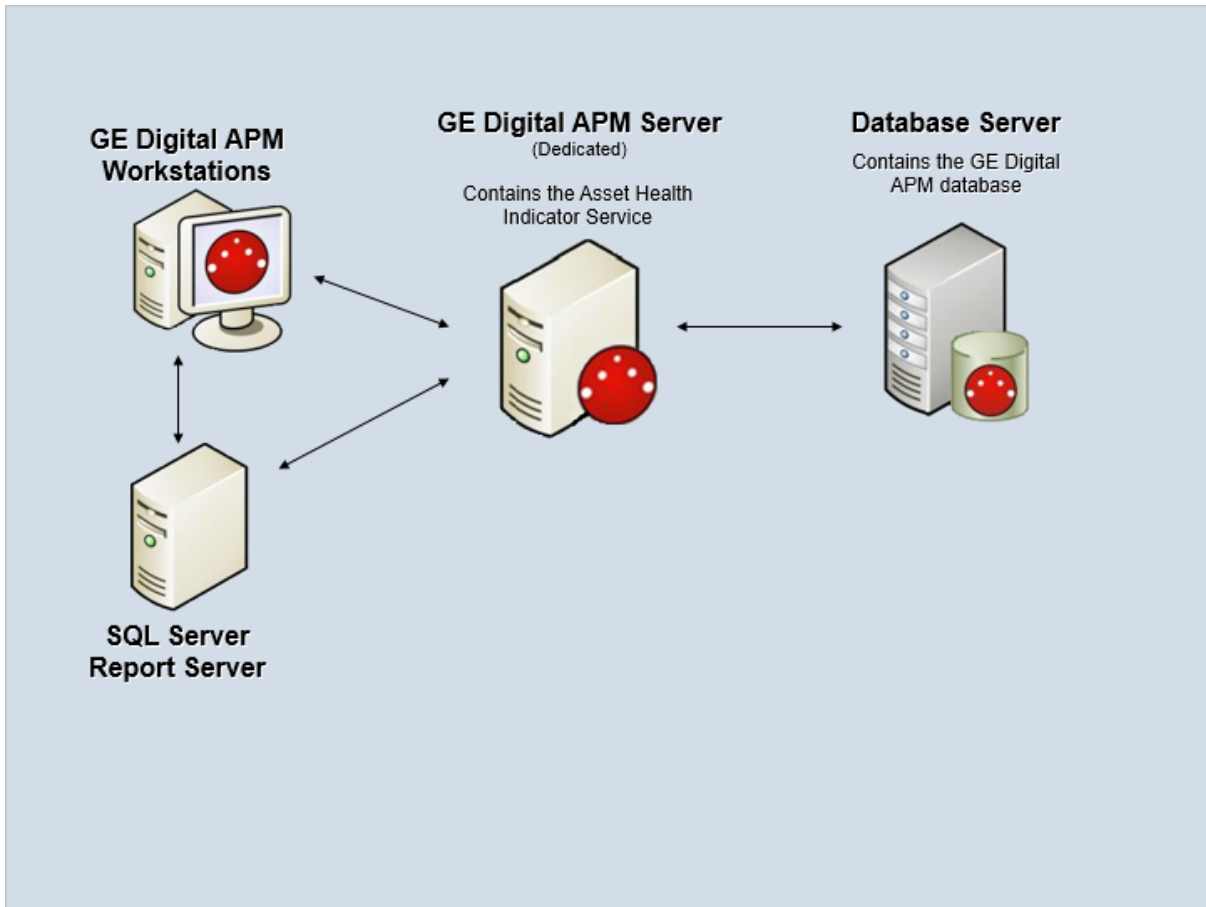
In addition, Asset Health Manager can be used to its complete potential only when it is integrated with one or more of the following modules:

- Rounds
- Asset Strategy Management
- Policy Designer
- Metrics and Scorecards
- Process Data Integration
- AMS Analytics
- GE System 1 Integration

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. For additional information on how services used by these three modules interact, select this link.

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

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

Supported Features in APM Now

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

Cognitive Analytics System Requirements

License Requirements

The *Cognitive Analytics* license is required to take advantage of the Cognitive Analytics functionality.

Deploying Cognitive Analytics

Cognitive Analytics is only deployable in APM Now. To use Cognitive Analytics in APM Now, you will need to perform some configuration steps specifically for Cognitive Analytics.

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.

GE Analytics System Requirements

License Requirements

The *GE System 1 Integration* license is required to take advantage of the GE Analytics functionality.

Additional Components Required

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

- **Enterprise Impact V17.1 SP 1:** A third-party component that exceeds the scope of this documentation.
- **RabbitMQ Server V3.5.3 and Later:** A third-party component that exceeds the scope of this documentation.

Data from GE systems, such as GE System 1 and GE SmartSignal, is transferred to GE Digital APM via Enterprise Impact 17.1 SP1. This GE Fleet Message Server represents the following components:

Note: We recommend that these components be installed on the same machine to simplify the configuration of this module. However, in your system architecture, these components may be installed on separate machines.

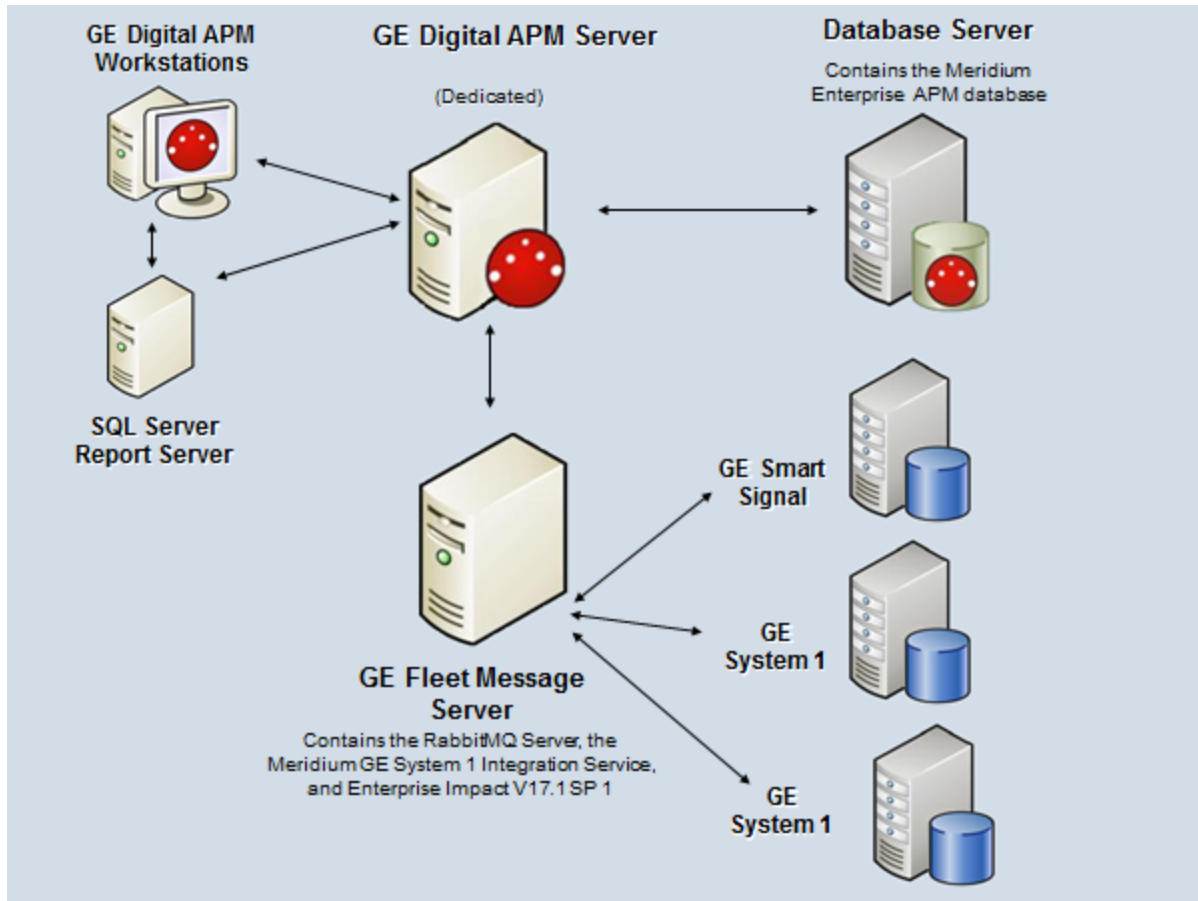
- **Enterprise Impact V17.1 SP 1:** A server that aggregates data from one or more GE systems and publishes the data to the RabbitMQ Server.

Note: There can only be one Enterprise Impact per GE Digital APM database.

- **Meridium GE System 1 Integration Service:** A service that subscribes to the published data aggregated by Enterprise Impact, and synchronizes the data to the GE Digital APM Database.
- **RabbitMQ Message Server:** An open source message broker used by Enterprise Impact to translate messaging protocols from the sender to the receiver.

System Architecture

The following image shows how the additional components should be incorporated into the basic GE Digital APM system architecture to support this module.



Deploying GE Analytics

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

Supported Features in APM Now

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

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.

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:

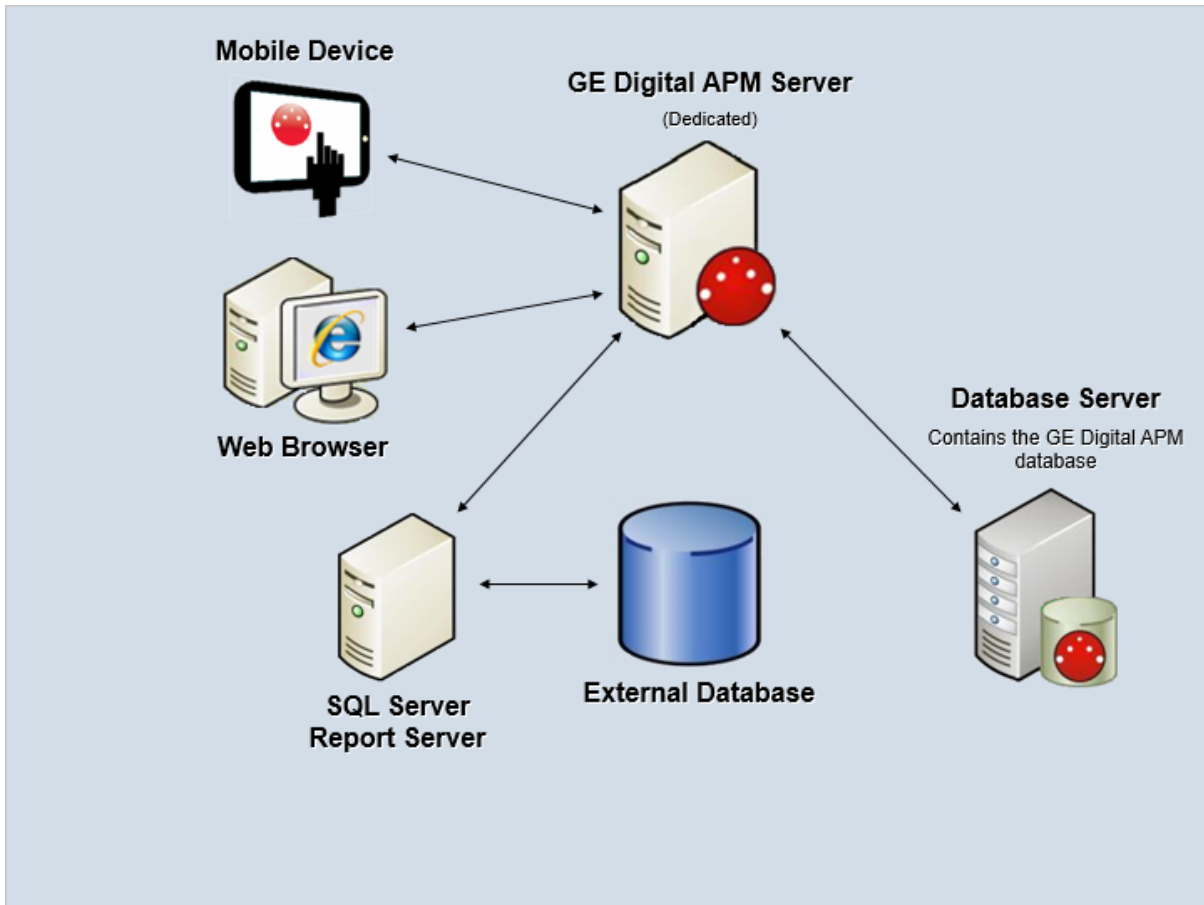
- A SQL Server Analysis Services Server machine that will host the Microsoft SQL Server Analysis Services software. The following versions of SQL Server Analysis Services are supported in this version of GE Digital APM:
 - Microsoft SQL Server Analysis Services 2012
 - Microsoft SQL Server Analysis Services 2014
- If you are using an Oracle database, in order 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 (i.e., 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. Note that 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 depicts 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 dedicated GE Digital APM Servers, it will contain only a single SQL Server Analysis Server that *all* of those GE Digital APM Servers will access.

Deploying Metrics and Scorecards

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

Supported Features in APM Now

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

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

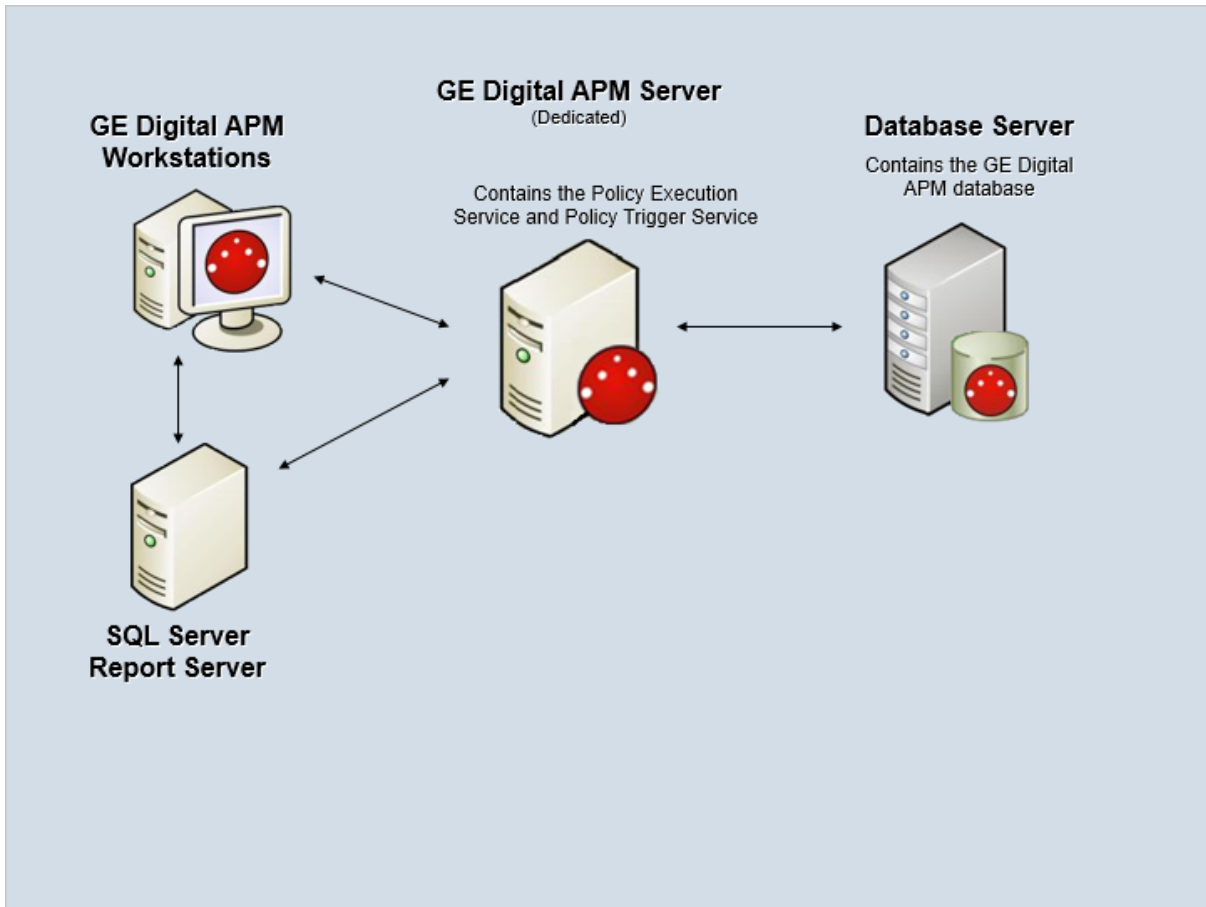
When you install the GE Digital APM Server, the Policy Execution Service and Policy Trigger Service are installed automatically. In order to execute policies, you must configure these services on the appropriate machines.

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 [Process Data Integration](#) and [Asset Health Manager](#), you must also configure the services associated with these modules. For additional information on how services used by these three modules interact, select this link.

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.

Process Data Integration (PDI) System Requirements

License Requirements

The *OPC Interfaces* license is required to take advantage of Process Data Integration functionality.

Additional Components Required

In addition to the basic GE Digital APM system architecture, the following additional components are required:

- **Meridium APM Process Data Integration Server:** A machine on which the Meridium APM Process Data Integration Service is installed. The Meridium APM Process Data Integration Server must contain Microsoft Message Queuing (MSMQ).

Note: While MSMQ is not a prerequisite to installing the Meridium APM Process Data Integration Service, it must exist on the machine before users begin using the Process Data Integration feature.

If you are using a virtual machine (VM) to host your Meridium APM Process Data Integration 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 supports Hyper-V and VMWare platforms.

These requirements may not be sufficient, depending upon 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, contact GE Digital.

- **OPC Server:** A machine on which the OPC-compliant server software is installed. The software requirements of this server are determined by the third-party distributor of the software.

To reduce your number of configuration tasks, (i.e., to avoid configuring a COM or DCOM connection), we recommend that this be the *same* machine as the Meridium APM Process Data Integration Server, (i.e., the machine on which the Meridium APM Process Data Integration Service is installed). If, however, your company restricts the installation of additional applications on the OPC Server, the Meridium APM Process Data Integration Server may be a separate machine from the OPC Server. Note that if you choose this deployment method:

- The OPC Server must be accessible from your Meridium APM Process Data Integration server.

- The Meridium APM Process Data Integration Server must connect to the OPC Server using a COM or DCOM connection. Meridium does not provide documentation or support for configuring this connection.

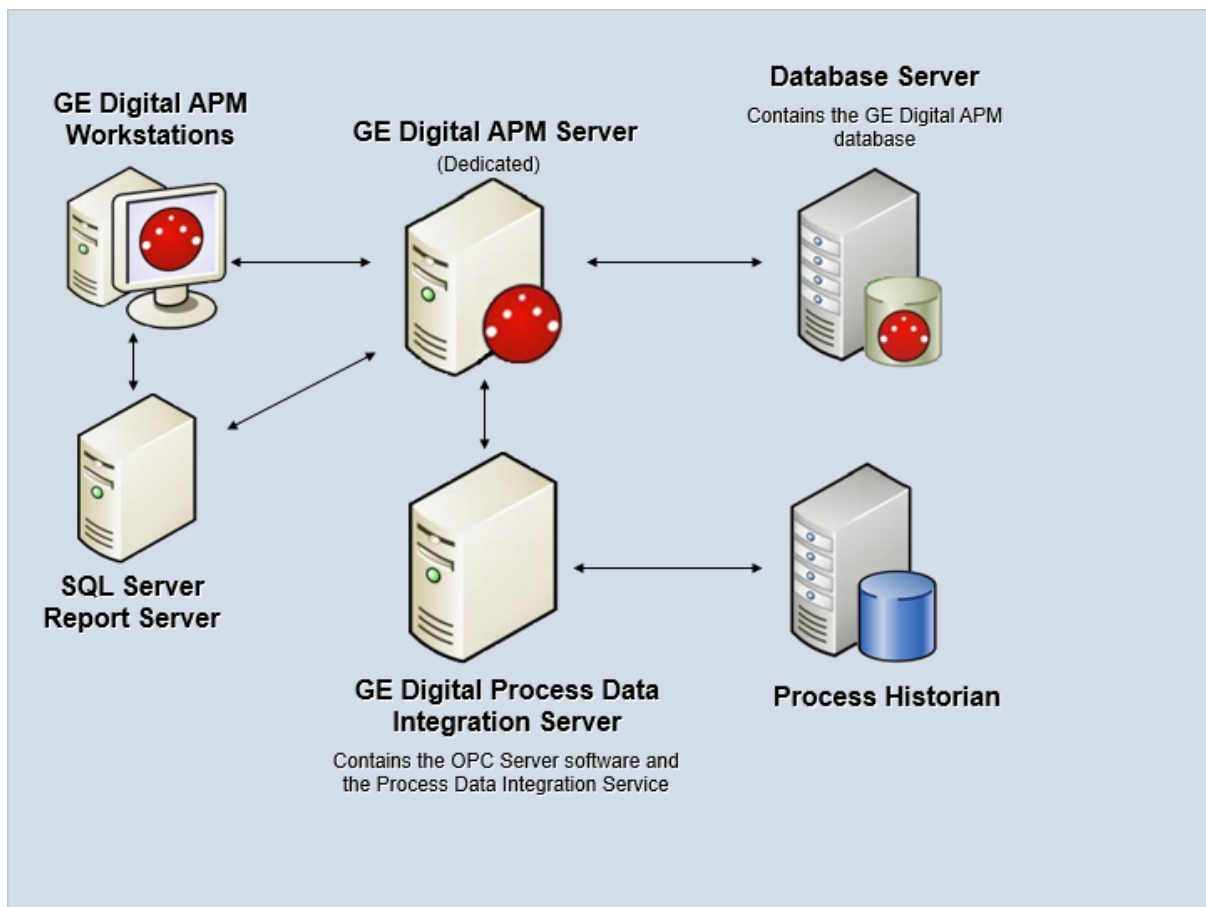
IMPORTANT: The OPC Server must pass time data to the Meridium Process Data Integration Service using the UTC time zone in order for the PDI functionality to work as designed.

- **Process Historian:** A machine that contains the process historian software. The software requirements of this machine are determined by the third-party distributor of the software.

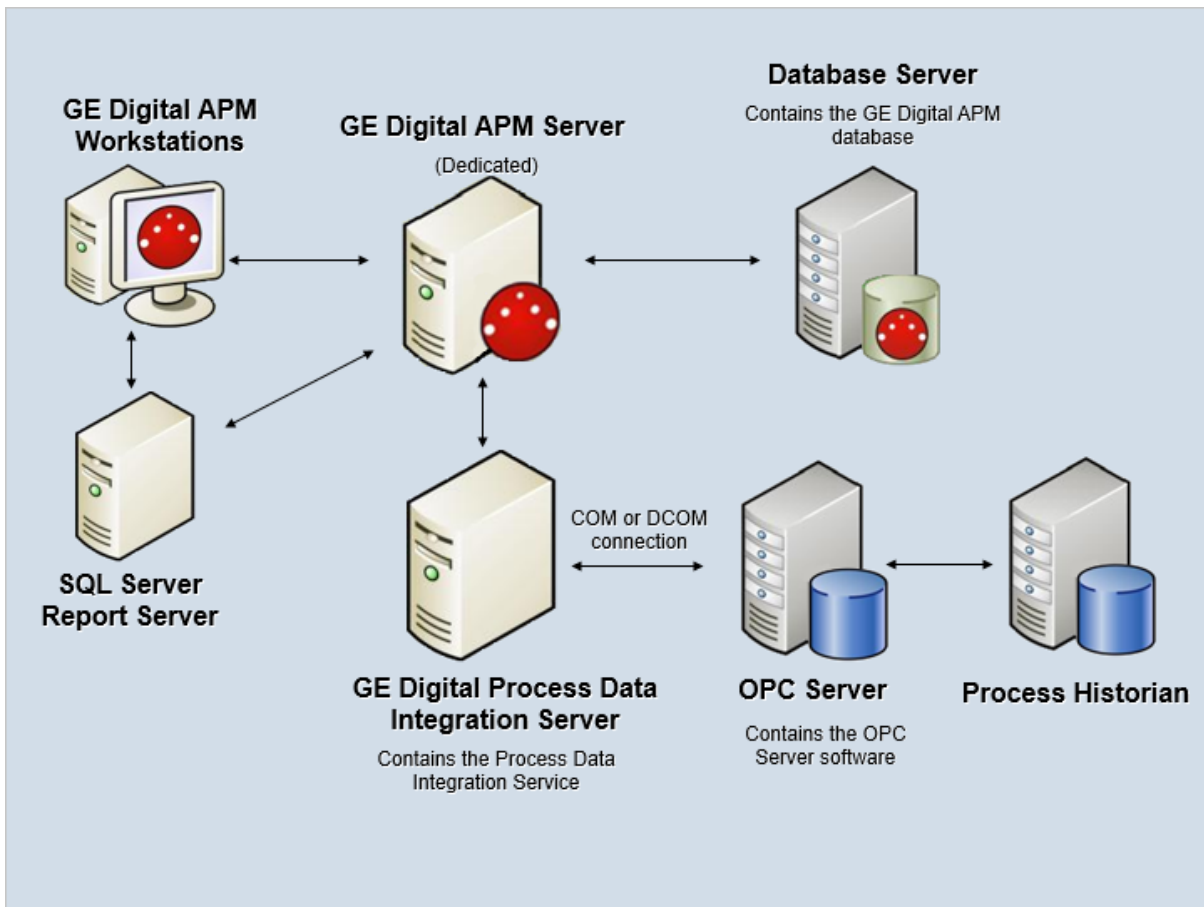
Refer to the [supported software and devices](#) documentation for information about the OPC Servers and process historians are supported for the PDI feature. Other OPC Servers and process historians have not been tested and connections to them are not supported by GE Digital.

System Architecture

The following image shows how these machines should be incorporated into the basic GE Digital APM system architecture if you implement the standard configuration where the OPC Server software and the Meridium APM Process Data Integration Service are installed on the same machine.



The following image shows the alternate configuration of these machines when the OPC Server software is installed on a *separate* machine from the Meridium APM Process Data Integration Service.



Deploying Process Data Integration

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

If you want to use Process Data Integration with [Asset Health Manager](#) and [Policy Designer](#), you must also configure the services associated with these modules. For additional information on how services used by these three modules interact, select this link.

Supported Features in APM Now

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

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, the following additional components are required:

- **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 [R Server website](#).

The GE Digital APM testing environment uses DeployR Open 8.0.0 and DeployR Enterprise 8.0.0.

Note: The World Wide Web Publishing service must be *enabled* on the R 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:

- RBI Criticality Analyses, RBI Pipeline Analyses, and RBI PRD Criticality Analyses are disabled.
- On the **Risk Based Inspection Overview** page:
 - **Generate Recommendations** is disabled.
 - The **Current Risk Overview** and **Past Risk Overview** charts will only plot the risk ranks for RBI 581 Risk Analyses.
 - The **Current Risk** and **Past Risk** widgets will only list RBI 581 Risk 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.

Recommended Actions System Requirements

License Requirements

The Meridium Core license is required to take advantage of the Recommended Actions functionality.

Supported Features in APM Now

In the APM Now environment, generating EAM Requests from Recommended Actions 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.

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:

- RBI 581 Risk Analyses are disabled.
- 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** work-spaces are not available.

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. In addition, if you want to use Barcode scanning and RFID scanning on a Windows Mobile handheld device, then the device must meet certain specifications.

GE Digital APM must be installed on each small screen device or Windows Mobile handheld device, and there is no restriction on the number of devices that can be used.

To use Rounds on Windows Mobile handheld devices, in addition to the basic GE Digital APM system architecture, your system must also contain the following additional components:

- **GE Digital APM Sync Services**
- **Microsoft Sync Framework**

In addition, when you configure Rounds on a Windows Mobile handheld device, you must install the following software, which is included in the GE Digital APM Sync Services installation, on the device:

- **.NET Compact Framework 3.5**
- **Microsoft SQL CE 3.5 SP1**
- **Microsoft Sync Services for ADO.NET 1.0 SP1**

Supported Features in APM Now

In the APM Now environment, support for Windows Mobile devices is unavailable. All other 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, the following additional components are required:

- Microsoft Visual Studio 2013 Professional or Microsoft Visual Studio 2015 Professional.
- Microsoft SQL Server Data Tools - Business Intelligence for Microsoft Visual Studio 2013 or Microsoft Visual Studio 2015.
- APM SSRS Data Processing Extension plugin for Microsoft Visual Studio from the Admin Installer.

Deploying Reports

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

Supported Features in APM Now

In the APM Now environment, SSRS report creation and modification feature 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, the following additional components are required:

- Microsoft Visual Studio 2013 Professional must be installed on every workstation where you want to work with GE Digital rules in the GE Digital APM system.
- Microsoft Visual Studio 2015 Shell must be installed after Microsoft Visual Studio 2013 Professional.
- MSXML must also be installed on all the workstations.
- 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.

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.