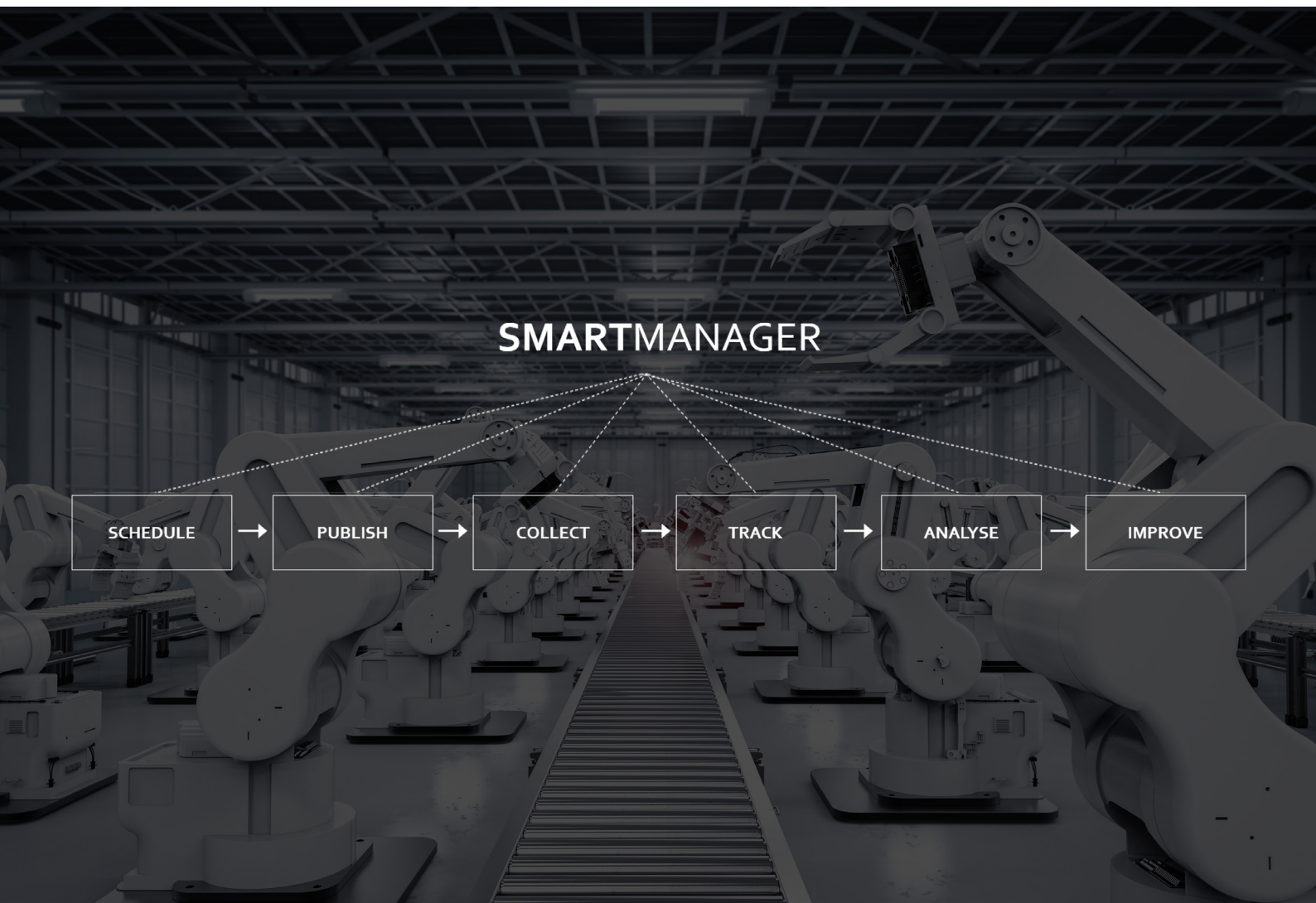


System Requirements

MANUFACTURING OPERATIONS MANAGEMENT



SMARTMANAGER



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Smart Manager 2016 System Requirements

LYNQ's Smart Manager 2016 solution provides complete manufacturing lifecycle management from planning, scheduling, publishing, collecting, tracking and analysing to optimise and improve end-to-end manufacturing operations.

Used in combination with an ERP system, this Manufacturing Execution System (MES) offers a unique level of delivery, cost and quality control of manufacturing operations for job shop, batch production, production line and mixed mode environments, helping to increase productivity, minimise loss and lower production costs.

The following sections list the minimum suggested hardware and software requirements for Smart Manager 2016. These requirements do not take into consideration any additional hardware or software requirements that are required by the ERP Vendor such as Microsoft Windows or Microsoft SQL Server. This document is provided as a guideline only and LYNQ cannot guarantee the accuracy of any information presented after the date of publication. LYNQ makes no warranties, express, implied or statutory, as to the information in this document.

Core features of Smart Manager 2016

Smart Manager 2016 Web Site

Smart Manager 2016 requires an instance of the application to be installed per ERP Company. Users connect to the Smart Manager 2016 site using windows authentication from their web browser. Each instance of Smart Manager 2016 is configured for a specific ERP company and it is recommended to install a separate instance for testing/training purposes in production environments. Users accessing the Smart Manager 2016 site outside of the corporate network will need to enter their domain and username credentials. Application rights are configured through the Smart Manager 2016 application.

SmartLYNQ Web Site

Smart Manager 2016 is a value added application that provides seamless integration with your ERP system through the web application SmartLYNQ. In addition to providing integration to your ERP system, SmartLYNQ maintains settings for the configuration of the Smart Manager 2016 document library. This application should be made available to system administrators and to any user that will maintain the integration of Smart Manager 2016. Users connect to the SmartLYNQ site using windows authentication from their web browser. Users accessing the SmartLYNQ site outside of the corporate network will need to enter their domain and username credentials.

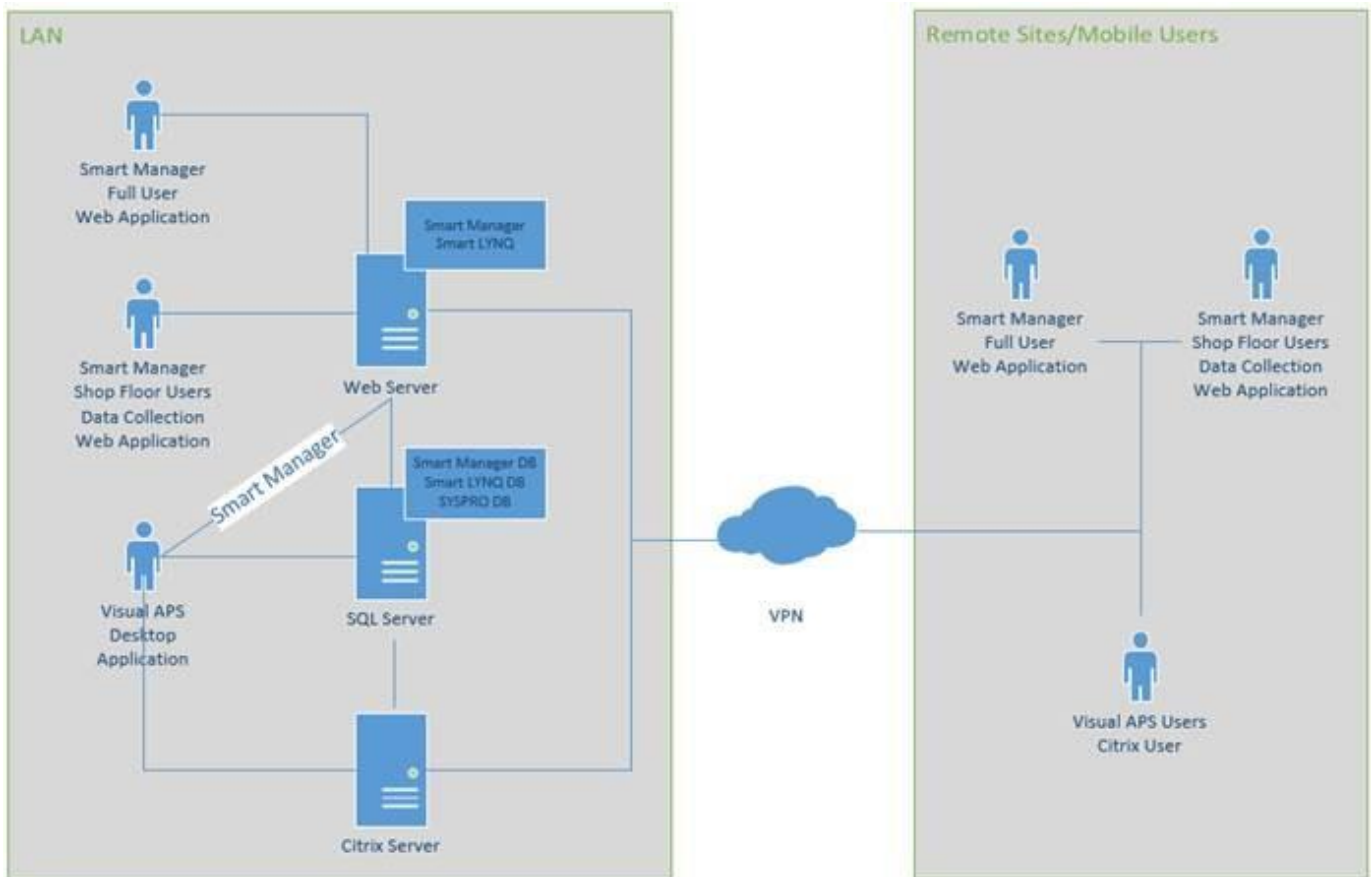
Visual APS Desktop Client

The Visual APS Desktop Client can be installed locally or on an application server supporting either Citrix or Terminal Services. In situations where Visual APS will be accessed by users in remote locations, the application should be run over Citrix or Terminal Services. Visual APS is used by your production planners for scheduling and publishing purposes. Users can connect to Visual APS using either Windows or SQL authentication. Application rights can be configured either from the application or within SQL explicitly. For users outside of the corporate network, SQL authentication must be used if they are not accessing the application on a Citrix/Terminal Server within the same corporate network where your ERP system is installed.

Two-Tier Server Configuration (Web and SQL on the same Server)

In the example of a two-tier setup, all components of Smart Manager 2016 will be installed on the same server. Smart Manager 2016, SmartLYNQ and the databases required for each application will reside on your ERP Server.

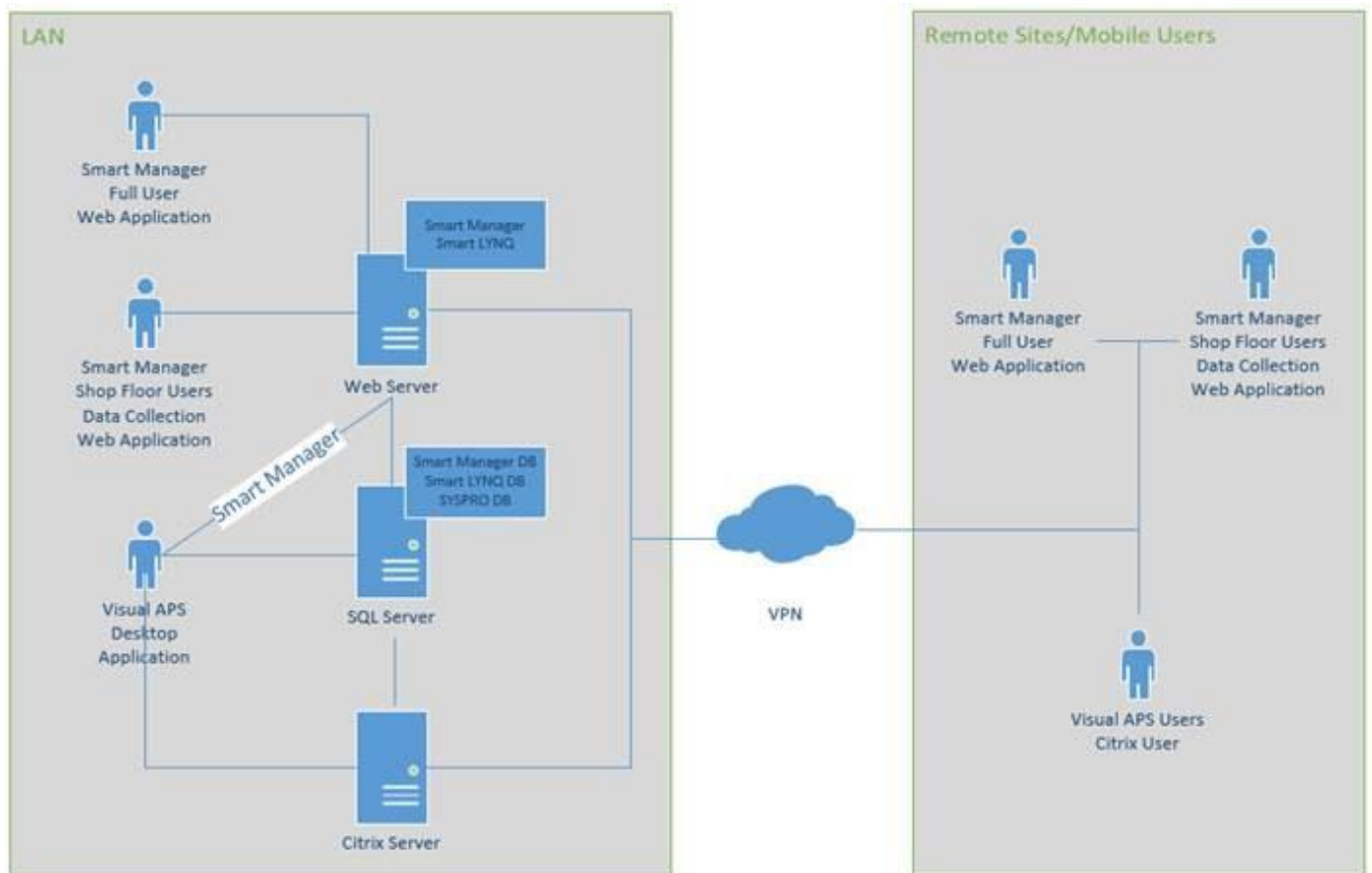
This type of setup is suitable for organisations with a low number of users and where performance and security of the application is less of a consideration.



Three-Tier Server Configuration (Dedicated Web and SQL Server)

In the example of a three-tier setup, components of Smart Manager 2016 will be installed on a dedicated Web and SQL Server. Smart Manager 2016 and Smart LYNQ will be installed on the Web Server and the applications databases will reside on the dedicated SQL Server.

This type of setup is suitable for organisations where performance and security of the application is an important consideration.



IMPORTANT: In both two and three tier configurations, the Smart Manager 2016 web site database(s) must reside on the same SQL Server as the ERP system. SQL Server must be configured in mixed mode authentication.

Minimum Hardware Requirements

The following hardware requirements should be considered for production environments.

Dedicated SQL Server

Company Size	Database Size	Users	RAM	Cores (virtual)	Cores (physical)
Small	<10GB	1 to 10	8GB	2 to 4	1 processor
Medium	10 to 50GB	11 to 100	16GB	4 to 6	2 processors
Large	50GB+	100+	24GB	6 to 8	2 processors

The disk capacity requirements for the SQL Server may increase/decrease depending on the volume of jobs/operations generated within your ERP system and the level of activity generated against these jobs/operations.

Dedicated Web Server

Smart Manager 2016 Instances	RAM	Cores (virtual)	Cores (physical)	Hard Disk*
1-2	4GB	2 to 4	1 processor	2GB
3-4	8GB	2 to 4	1 processors	4GB
5+	16GB	4 to 8	2 processors	5GB+

*Allow 1GB of Disk Space per Smart Manager 2016 instance and add any additional space requirements for storing attachments in the document library.

Application Server (Citrix/Terminal Services) for Visual APS

The application server should not host the Microsoft SQL Server or Internet Information Services due to performance concerns. The application server will require a certain amount of RAM to be set aside for the operating system, leaving the rest for client sessions.

Visual APS is processor intensive. While processing the auto scheduling operation, we recommend that you dedicate a separate processor (core) for each Visual APS session. Supplying additional cores for the applications auto scheduling operation will provide faster performance almost proportionally to the number of cores you have used.

Visual APS uses Random Access Memory (RAM) to hold all data while it processes planning data. Each installation will vary on the amount of memory required based on the amount of process data. You should consider 4/8GB RAM per Visual APS session depending on the complexity of scheduling requirements and volume of data.

Smart Manager 2016 Application and Shop Floor Users

Hardware	<ul style="list-style-type: none"> • PC, Laptop, Tablet PC, Smartphone, iPad • USB Host port or Bluetooth for Data Input Devices (Barcode Scanners) • 1GHz Processor (Dual Core preferable) • 2GB RAM • 10" screen minimum for tablet devices • 1920 x 1080 minimum screen resolution • Tablet case protector (optional) • Tablet wall mounting devices (optional) • 100Mb/1Gb Network Interface/WIFI Interface
Software	<ul style="list-style-type: none"> • Android and iOS • Windows 7 • Windows 8 • Windows 10 • Internet Explorer 11, Google Chrome, Safari) • Microsoft Edge

Visual APS Desktop Client

RAM	Cores (virtual)	Cores (physical)	Hard Disk	NIC	Screen Resolution
4GB/8GB	2 to 4	1 processor	1GB	100MB/1GB	21"-24" (1920 x 1080)

SQL Disk and Database Configurations

Smart Manager 2016 maintains separate databases for the application logic, application data and the application configuration. It is recommended that the recovery model in Microsoft SQL Server set against the application database is set to full recovery for disaster recovery purposes.



NOTE: Remember to include in any disk capacity calculations adequate space for storing transaction logs, incremental and full SQL backups as required.

Unless you can tolerate any downtime, you should add protection to your servers against unexpected drive failures by using RAID. Hardware RAID implementations are always preferred over software RAID implementations. RAID 0 (disk striping without parity) offers optimal read/write performance, but if a drive fails, IIS/SQL won't be able to continue operation until the drive is replaced and its contents are restored from backup. Because of this, RAID 0 isn't the recommended choice. RAID 1 (disk mirroring) creates duplicate copies of data on separate physical drives, allowing the server to remain operational when a drive fails, and even while the RAID controller rebuilds a replacement drive in a failed mirror. RAID 5 (disk striping with parity) offers good protection against single-drive failure but has poor write performance. RAID 1+0 (disk striping and mirroring with parity) offers the best level of performance and protection.

For the best network throughput, all servers should be configured with a 1GB Network Interface.



NOTE: Hardware requirements for both the Database and Web Server should be periodically reviewed to ensure Smart Manager 2016's response times are within acceptable levels for your organisation. To maintain read/write times it is recommended that Microsoft SQL Server Database Maintenance plans are configured to rebuild and reorganise data on a regular basis.

Software Requirement & Pre-Requisites

The following tables detail the minimum software requirement for all components of Smart Manager 2016.

Minimum Software Requirements – Web Server

Operating System	<p>Smart Manager 2016 is supported on the following operating systems</p> <ul style="list-style-type: none"> • Windows Server 2008 R2 • Windows Server 2012 • Windows Server 2012 R2
Additional Software	<ul style="list-style-type: none"> • IIS 7.0+ with .NET Extensibility enabled <ul style="list-style-type: none"> ○ ASP.NET Impersonation and Windows Authentication enabled • Microsoft .NET Framework 4 and above • SSL Certificate (optional)
Supported Browsers	<ul style="list-style-type: none"> • Internet Explorer 11+ • Microsoft Edge • Google Chrome • Safari

Minimum Software Requirements – Database Server

Microsoft SQL Server	<ul style="list-style-type: none"> • Microsoft SQL Server, Standard and Enterprise <ul style="list-style-type: none"> ○ Versions 2005, 2008, 2008R2, 2012, 2014
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Minimum Software Requirements – Visual APS

Operating System	<p>Visual APS is supported on the following operating systems</p> <ul style="list-style-type: none"> • Windows 7 • Windows 8 • Windows 10 • Windows Server 2008 R2 • Windows Server 2012 • Windows Server 2012 R2
Additional Software	<ul style="list-style-type: none"> • Microsoft .NET Framework 4 and above • Citrix and Microsoft Terminal Services (optional)
Supported Browsers	<ul style="list-style-type: none"> • Internet Explorer 11+ • Microsoft Edge • Google Chrome • Safari