k3 syspro

A report for: SYSPRO 8 Recommended Guidelines for Hardware Specifications

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1   Overview

This document details recommended guidelines for system specification requirements for SYSPRO 8. Every effort has been made to ensure that the information contained in this document was correct at the time of publishing.

We recommend that you contact hardware and operating system vendors for the most up-to-date information regarding availability and support.

We are trying to adhere to Microsoft and SYSPRO best practices throughout this document but we do understand that not everyone can adopt these best practices due to various restrictions therefore there should be an element of flexibility within these recommended specifications.

We would just ask you to discuss your proposed specifications with someone in our Technical Team at K3 Syspro to ensure of its approval.

There are several pertinent factors to consider when reading this document:

1.1   2-Tier and 3-Tier implementations:

2-Tier: Client / Server (1 server hosting SYSPRO\SQL, multiple clients)
2-Tier implementations are suitable for up to 30 users.

3-Tier: Client / Application Server / SQL Server (2 servers (1 x SYSPRO & 1 x SQL, multiple clients)
3-Tier implementations are required for beyond 30 users.

1.2   Recommended and Minimum specifications:

Recommended Specification – these specifications are designed using SYSPRO and Microsoft guidelines combined with K3's experience of designing, implementing and supporting SYSPRO and SQL Server Architecture.

Minimum Specification - this is the bare minimum requirements for the SYSPRO application to install and run. Using this specification will not provide adequate performance over the lifespan of a server for many SYSPRO installations.

Other Considerations – any other 3rd party or K3 Syspro supplied software such as Orchard, DataSwitch, Translution etc… should also be considered when designing the infrastructure. Technical specifications would need to be obtained for this additional software therefore ensuring they are included in the overall design\specification.

1.3   Microsoft Support Life Cycle:

As SYSPRO is primarily used on Microsoft platforms and Microsoft SQL Server, we try and adhere to the Microsoft Support Life Cycle. Therefore, when Microsoft cease supporting any of their products then these products will be taken off the SYSPRO supported list for example: SQL Server 2005 SP4 support expired in April 2016 therefore it is no longer the minimum supported version for SYSPRO. SYSPRO will still work with SQL 2005 but would a customer want to run their business on an unsupported SQL version.

1.4   CPU sizing guidelines:

All CPU sizing guidelines are per physical CPU. SYSPRO is not Symmetric Multiprocessing capable. However multi-core CPUs are still recommended to allow Windows and SQL to Symmetric Multiprocessing.

1.5   SQL Server Express Edition:

Here is an example of this documents flexibility. You will not see SQL Server Express edition defined in any of the specifications but we do understand that for a 1 to 5 user SYSPRO system it may be cost effective to utilise the free version of SQL Server, namely Express.

However please be aware of the following restrictions which are enforced by Microsoft around this edition (SQL 2017):

- Maximum database size of 10 GB per database
- No SQL Server Agent service
- No backup compression
- Single physical CPU or 4 x cores allowable
- 1410 MB of RAM (runs on a system with higher RAM amount, but uses only at most 1.4 GB per instance)
- No Analysis Services
- No Database Mail
- No Always-On Availability
- No SQL Profiler

We would recommend that the SQL Management Studio Express is also installed to enable ad-hoc backups to be

performed as well as managed the User databases and it is possible to perform automated SQL backups and other optimization tasks through Windows Scheduled Tasks.

SYSTEM SPECIFICATIONS

The System Specifications information is broken down into the following areas:

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2.2 Minimum Client

2.3 Microsoft Office Important Note

2.4 Recommended SYSPRO Application Server (3-Tier)

2.5 Minimum SYSPRO Application Server (3-Tier)

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2.8 Recommended SYSPRO/SQL Server (2-Tier)

2.9 Minimum SYSPRO/SQL Server (2-Tier)

2.10   Recommended Windows Terminal Server

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2.12 Virtualisation

The recommendations of memory, hard disk space and CPU requirements are catering for the SYSPRO application and the operating system; it does not cover any other applications that need to run simultaneously with SYSPRO.

2.1   Recommended Client

Recommended Operating System:
        Windows 10 or above 64bit (Not Home Edition)

Recommended Microsoft Office:

Office 2016
Office 365 (Locally installed and
        Cloud based supported)
        32bit or 64bit (See Note)

Hardware Specification:

Hardware Element	Recommended Specification
Memory	8GB
CPU	2.4GHz or above
Network Card	1GB or above

Screen Resolution	1024x768 (minimum) 96dpi
Hard Disk Free Space	1GB
Graphics Card	Dedicated with 512mb (minimum)
Internet Explorer	6.0 or above
Microsoft .NET	2.0
	4.0
	4.5
	4.6
JAVA Runtime	7 Update 1 or above

2.2   Minimum Client

Minimum Operating System:
        Windows 7 SP1 64bit

Minimum Microsoft Office:

        Office 2010 32bit (Not 64bit)

Hardware Specification:

Hardware Element	Minimum Specification
Memory	4GB
CPU	2.4GHz or above
Network Card	1GB or above

2.3   Microsoft Office Important Note

The following is not supported on a 64-bit version of Office 365, Office 2016, Office 2013 or Office 2010:

- The calendar control on the SYSPRO Main Menu
- SYSPRO Office Integration (SOI) components

2.4 Recommended SYSPRO Application Server (3-Tier)

Our recommendation below is based upon a 30 SYSPRO user system.

Recommended Operating System:
        Windows 2016 Standard

Recommended Disk Configuration:

        4 x 15k SAS 146 GB disks in RAID 10 (SSD disks are supported)

Hardware Specification:

Hardware Element	Recommended Specification
Memory	12GB
CPU	2.4GHz or above 1 x 6 core
Network Card	1GB or above

Media	DVD drive
Power	Redundant Power Supply

2.5 Minimum SYSPRO Application Server (3-tier)

Minimum Operating System:
    Windows 2008 R2 64bit

Minimum Disk Configuration:

    2 x 10k SAS 300GB disks in RAID 1 (SSD disks are supported)

Hardware Specification:

Hardware Element	Minimum Specification
Memory	10gb
CPU	2.0GHz or above 1 x Quad core
Network Card	1GB or above

2.6 Recommended SQL Server (3-tier)

Our recommendation below is based upon a 30 SYSPRO user system.

Recommended Operating System:
    Windows 2016 Standard

Recommended SQL Server:
    SQL Server 2016 Standard 64bit

Recommended Disk Configuration (SSD disks are supported also):
    2 x 15k SAS 146 GB disks in RAID 1 (O/S)
    2 x 15k SAS 146 GB disks in RAID 1 (Transaction Logs\Tempdb)
    4 x 15k SAS 146 GB disks in RAID 10 (Databases\Backups)

Hardware Specification:

Hardware Element	Recommended Specification
Memory	14GB or above
CPU	2.2GHz or above 2 x quad core
Network Card	1GB or above
Media	DVD drive
Power	Redundant Power Supply

2.7 Minimum SQL Server (3-tier)

Minimum Operating System:
    Windows 2008 R2 64bit

Minimum SQL Server:
    SQL Server 2008 R2 Standard 64bit

Minimum Disk Configuration:

2 x 15k SAS 300 GB disks in RAID 1 (Operating System\SQL Transaction Logs)

3 x 15k SAS 146 GB disks in RAID 5 (SQL Database)

Hardware Specification:

Hardware Element	Minimum Specification
Memory	8GB
CPU	2.0GHz or above 1 x Quad core
Network Card	1GB or above

2.8 Recommended SYSPRO Application/SQL Server (2-tier)

Recommended Operating System:
Windows 2016 Standard

Recommended SQL Server:
SQL Server 2016 Standard 64bit

Recommended Disk Configuration:

2 x 15k SAS 300 GB disks in RAID 1 (Operating System)

2 x 15k SAS 300 GB disks in RAID 1 (SQL Transaction Logs)

4 x 15k SAS 300 GB disks in RAID 10 (SQL Database)

Hardware Specification:

Hardware Element	Recommended Specification
Memory	20GB or above
CPU	2.2GHz or above 2 x 6 core
Network Card	1GB or above
Media	DVD drive
Power	Redundant Power Supply

2.9 Minimum SYSPRO Application/SQL Server (2-tier)

Minimum Operating System:
Windows 2008 R2

Minimum SQL Server:
SQL Server 2008 R2 Standard, x86 or x64

Minimum Disk Configuration:

2 x 15k SAS 300 GB disks in RAID 1 (Operating System\SQL Transaction Logs)

4 x 15k SAS 300 GB disks in RAID 10 (SQL Database)

Hardware Specification:

Hardware Element	Minimum Specification
Memory	12gb
CPU	2.8GHz or above 1 x 6 core
Network Card	1gb

2.10 Recommended Windows Remote Desktop Server (formerly Windows Terminal Server)

Our recommendation below is based upon a 30 SYSPRO user system
with all 30 users using the RDS. However sometimes it is better to
have multiple RDS servers being load balanced with each server
having 15 – 20 user connections therefore the specifications below
will need to spread across 2 x RDS servers based upon each server
having 15 connections.

Recommended Operating System:
    Windows 2016 Standard

Recommended Disk Configuration:
    2 x 15k SAS 300 GB disks in RAID 1 (Operating System\Client Applications)

Hardware Specification:

Hardware Element	Recommended Specification
Memory	12GB or above
CPU	2.4GHz or above 2 x 6 cores
Network Card	1GB or above
Media	DVD drive
Power	Redundant Power Supply

2.11 Minimum Windows Remote Desktop Server

Minimum Operating System:
    Windows 2008 R2

Minimum Disk Configuration:
    2 x 15k SAS 300 GB disks in RAID 1 (Operating System\Client Applications)

Hardware Specification:

Hardware Element	Minimum Specification
Memory	10GB
CPU	2.0GHz or above 2 x 6 cores
Network Card	1GB or above

2.12 Virtualisation

SYSPRO is supported on the Microsoft Hyper-V and VMware range of virtual server software.

> Windows Server 2008 R2 Hyper-V
>
> Windows Server 2012 Hyper-V
>
> Windows Server 2012 R2 Hyper-V
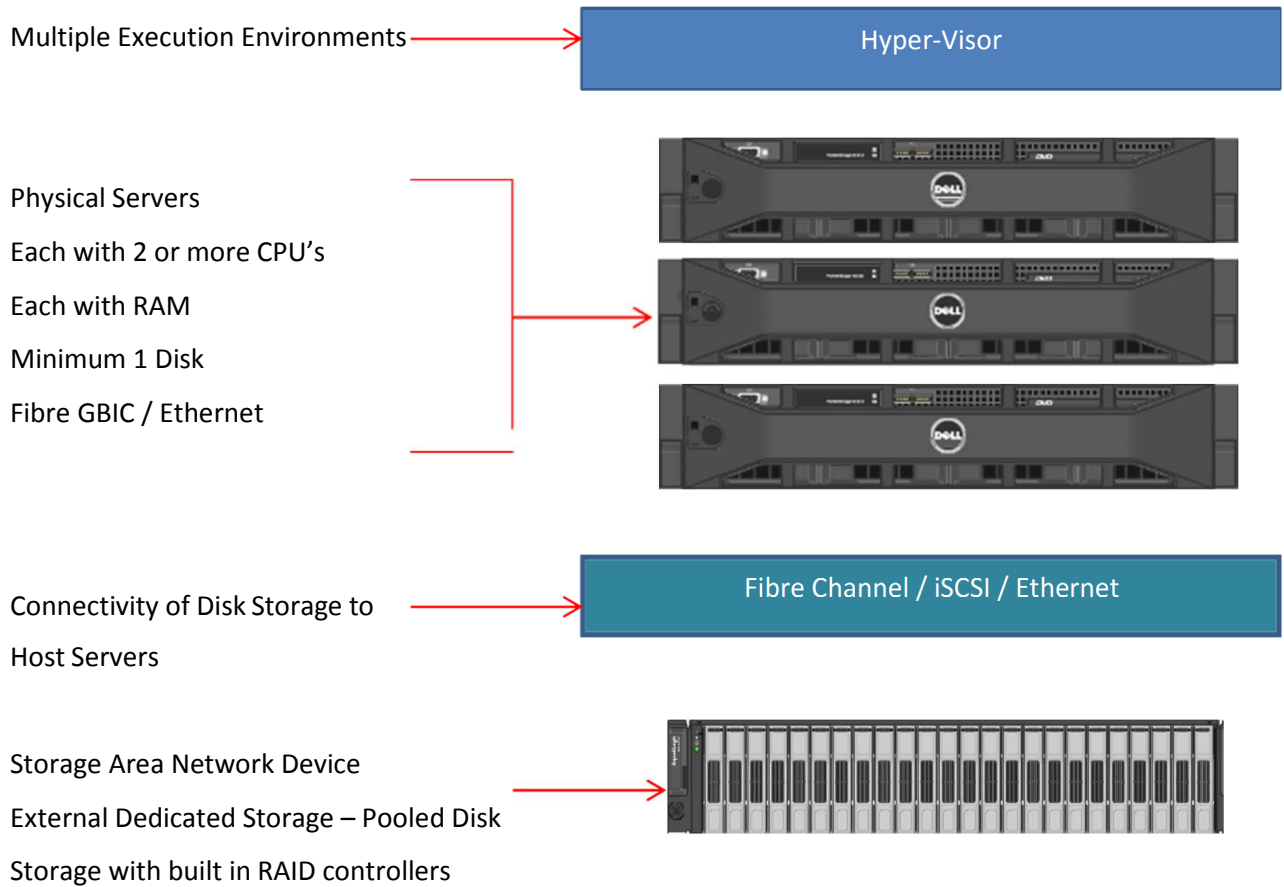>
> Windows Server 2016 Hyper-V
>
> VMware

Virtualisation of the SYSPRO Application server does not have any major recommendations unlike the virtualising of the SQL Server which has best practice recommendations from Microsoft which we are adhering to in our recommendation below.

Microsoft recommends that the SQL Server disk storage is held away from the Host server of the virtual; therefore, either Network Attached Storage (NAS) or Storage Area Network (SAN) devices should be incorporated in a SQL virtual infrastructure.

Recommended Topography for a SYSPRO/SQL Virtual Configuration:

Multiple Execution Environments ———————▶ | Hyper-Visor |

Physical Servers

Each with 2 or more CPU's

Each with RAM

Minimum 1 Disk

Fibre GBIC / Ethernet

Connectivity of Disk Storage to ———————▶ | Fibre Channel / iSCSI / Ethernet |

Host Servers

Storage Area Network Device

External Dedicated Storage – Pooled Disk

Storage with built in RAID controllers

We recommend the following disks/configuration within the SAN device:

15K RPM SAS Disk – which gives approx. 190 IOPS per disk

RAID 10 & 1 – SQL Databases & Transaction Logs/TEMPDB

respectively

3   Other Recommendations

There are several other recommendations mainly around the SQL installation/configuration which need to be documented.

Although K3 Syspro have a team who can install the SQL Server software, you may decide to install it yourself and if so please consider these other recommendations:

3.1   Storage

Multiple drives should be implemented for a SQL Server installation covering the following activities:

- Operating System/SQL Server install
- Database files
- Transaction Log files
- SQL Backups
- TEMPDB

TEMPDB and the SQL Transaction Log files should be on the fastest disks possible, SSD preferably or failing that 15k SAS disks. Also, 64kb block size is recommended.

Here is an example of a recommended drive structure for a dedicated SQL Server:

C: - Operating system/SQL Server install
D: - Database files
E: - Local Maintenance Plan Backup files
L: - Transaction Log files
T: - TEMPDB location

If the SYSPRO application is also going to be installed on the SQL Server platform (2-Tier) then the SYSPRO software should also have its own drive allocation, like this example:

C: - Operating system/SQL Server install
D: - Database files
E: - Local Maintenance Plan Backup files
F: - SYSPRO application install
L: - Transaction Log files
T: - TEMPDB location

Note: If the SYSPRO application is being installed on its own server (3-Tier) then this is not subject to a multi-drive recommendation therefore falls back onto your IT standard.

3.2   Storage Size

Sizing depends on the number of databases, how many transactions per database and if already a SYSPRO customer the size of the current databases.

Any sort of sizing would be a guideline and steps must be in place to allow increasing these sizes in the future.

We recommend that the TEMPDB drive (T: in our example) should be around 20 GB and an explanation of how we get to this size is explained in the next section.

3.2   SQL Installation

As part of the SQL Server software installation it is advisable to follow these standards:

- Only install the SQL components required – standard SYSPRO does not make use of Reporting Services or Analysis Services
- Change drive letters/paths to match your multi-drive structure e.g. T:\SQLDATA\ for TEMPDB etc.…
- Separate Service Accounts for each SQL service being installed (All Features with Defaults)
- Set SQL Server Agent to Automatic Startup
- Default SQL Collation (SYSPRO uses Latin1_General_BIN collation so this will be manually created)
- Mixed Mode (SQL and Windows Authentication)

3.3   TEMPDB

As part of the standard SQL Server installation (SQL Server 2014 or below) only 1 x TEMPDB datafile and 1 x TEMPDB transaction log file is created. However, Microsoft's best practices recommend 1 x TEMPDB datafile for each CPU core up to 8.

Determine how many cores have been allocated to the server and create the additional datafiles in the correct drive location (T: in our example). Only 1 x TEMPDB transaction log file will be required.

If installing SQL Server 2016 this now will provide its recommendation of how many TEMPDB files should be created, however you will still need to change the Initial size and Auto Growth options detailed below.

With regards the size of each TEMPDB datafiles our recommendation would be as follows:

- Initial size of each datafile to be 512Mb
- Auto Growth for each datafile to be 128Mb

The additional datafiles can be added via the TEMPDB database properties within SQL Management Studio and we would recommend a naming standard as follows:

T:\SQLDATA\tempdb01.mdf
T:\SQLDATA\tempdb02.mdf
T:\SQLDATA\tempdb03.mdf etc.…

3.4   SQL Trace Flags

Throughout the builds of SQL Server, certain trace flags have been recommended as Best Practice, however Microsoft have finally started to implement these features as standard from SQL Server 2016 onwards.

Please check the trace flags below against your proposed SQL Server version to ensure if these flags are no longer required.

Certainly SQL Server 2012 or below will require these Trace Flags to be entered and these can be implemented at any time following the SQL Server installation. Our Technical Team will check if these are present prior to implementing SYSPRO:

T1117 - to allow all files within a file group to grow uniformly such as TEMPDB, if one datafile is required to grow the rest will be grown by the same amount thus all datafiles remain at the same size as each other and the workload spread is maintained.

T1118 - By default SQL Server is set to use "mixed extents", this is not the best situation for performance and for this Microsoft introduced a Trace Flag (T1118). This means that each newly allocated object within any database has a fixed extent size of 64kb. As TEMPDB is usually the location where most objects are created on a day to day basis, it is the location which benefits more from having fixed size extents.

T4199 - This activates Query Optimizer fixes from many different hotfixes which Microsoft have released through all versions of SQL Server. By default, Microsoft have left all hotfixes for Query Optimizer disabled, this one Trace Flag switches them all on. For SQL Server 2016 Microsoft has changed this default so that all hotfixes for Query Optimizer are switched on.

T2371 - This changes the behavior of the Auto Update Statistics. By default, the Auto Update Statistics has a threshold of 20% change before the Auto Update will gather the statistics of a database object (the statistics help the Query Optimizer to determine the best execution plan for a query, the more up to date the statistics the better the Query Optimizer has of creating the most performant execution plan). This Trace Flag assists with larger tables as it becomes more dynamic its statistics update frequency is to be more on a row base. The larger the table, the lower the threshold, the more frequently the statistics are "Auto Updated".

T3226 - By default, every successful backup operation adds an entry in the SQL Server error log and in the system event log. If you create very frequent log backups, these success messages accumulate quickly, resulting in huge error logs in which finding other messages is problematic.
With this trace flag, you can suppress these log entries. This is useful if you are running frequent log backups and if none of your scripts depend on those entries

4   Calculating Minimum Recommended Specifications

4.1   Calculation SYSPRO Application Server (3-tier)

The calculation is provided to determine the right amount of memory and CPU, if the specification is

required for more than 30 users. These calculations are the suggested minimum per client.

Memory Calculation:

220MB per SYSPRO user + 2 GB (O/S) = minimum Server memory

e.g. 50 users

50 x 220 MB + 2 GB = 13GB

CPU Calculation:

110 MHz per SYSPRO user + 2 GHz (O/S) = minimum Server CPU

e.g. 50 users

50 x 100 MHz + 2 GHz = 7.5GHz (Quad core 2.0GHz)

4.2 Calculation SQL Server (3-tier)

The calculation is provided to determine the right amount of memory and CPU, if the specification is required for more than 30 users. These calculations are the suggested minimum per client.

Memory Calculation:

250MB per SYSPRO user + 2GB (SQL Core) + 2 GB (O/S) = minimum Server memory

e.g. 50 users

$50 \times 250 \text{ MB} + 2 \text{ GB} + 2 \text{ GB} = 16.5\text{GB}$

CPU Calculation:

90 MHz per SYSPRO user + 2 GHz (O/S) = minimum Server CPU

e.g. 50 users

$50 \times 90 \text{ MHz} + 2 \text{ GHz} = 6.5 \text{ GHz (Quad core 2.0GHz)}$

4.3 Calculation Windows Remote Desktop Server (RDS)

The calculation is provided to determine the right amount of memory and CPU, if the specification is required for more than 30 users.

Typically, rather than having 1 big RDS server, we would recommend implementing a Load Balanced solution with possibly a 15 – 20 user connection limits on each RDS server (the same would be said for a Citrix farm).

These calculations are the suggested minimum per client, just running the Core SYSPRO client.

Memory Calculation:

250mb per SYSPRO user + 2 GB (O/S) = minimum RDS memory

e.g. 50 users

$50 \times 250 \text{ MB} + 2 \text{ GB} = 14.5\text{GB}$

CPU Calculation:

600 MHz per SYSPRO user + 2 GHz (O/S) = minimum RDS CPU

e.g. 50 users

$50 \times 600\text{MHz} + 2 \text{ GHz} = 32 \text{ GHz (2 x 2.66GHz Six core)}$