

The PSD Suite will run on computer hardware that meets or exceeds the minimum specifications listed in this document. Please ensure compliance with these standards as PSD will not be able to support our software on non-compliant hardware platforms.

The following specifications are the minimum recommended for new hardware as at July 2009, and represent an effective balance between performance and affordability. Higher specifications will offer better performance, and should be considered in high volume establishments.

**Computer Specifications**

Description	Low Volume Server	Medium Volume Server	High Volume Server	Workstation / Point of Sale	Notebook Computer
<b>Simultaneous Users</b>	Less than 10	Less Than 75	Less than 500		
<b>Daily Check-ins + Transactions</b>	Less than 500	Less than 5000	No Limit		
<b>Processor</b>	Core 2 Duo E 8400 or better	Core 2 Quad 2.5GHz or better	Xeon Quad Core 2.5GHz or better	Intel Pentium D/ Intel Core 2 Intel Celeron E1400 AMD Athlon X2	Intel Core 2 Solo Intel Celeron E 1400 AMD Athlon X2
<b>RAM</b>	4GB	8GB	12GB	1GB	1GB
<b>Hard Disk</b>	2 x 7 200 rpm SATA hard disks in RAID 1	2 x 10 000 rpm SATA hard disks in RAID 1 (eg WD Velociraptor)	2 x 15 000 rpm SCSI hard disks in RAID 1	80GB	80GB
<b>Back-up</b>	DVD Read Write	DVD Read Write	DVD Read Write	DVD Read Write	DVD Read Write
<b>Network</b>	100mbps	100/1000mbps	1000mbps	100mbps	100mbps
<b>Modem</b>	fax/data	fax/data	fax/data	voice/fax/data	voice/fax/data
<b>Operating System*</b>	Windows XP x64 Edition	Windows Small Business Server 2008 Premium	Windows Server 2008	Win XP Pro / Vista Pro	Win XP Pro / Vista Pro
<b>Database</b>	SQL Express 2005	SQL Server Standard (included with OS)	SQL Server 2008		

\*PSD suite will not run on Win95; Win98; WinME; NT4 Workstation

**Directive on hard disks**

As the database expands beyond the size of the physical memory, the speed of the hard drive comes into play. For a database server, however, the most important factor is reliability. For that reason PSD recommends 2 x SATA hard drives in a RAID1 configuration. The Western Digital Raptor series of hard disks provide blistering performance but at a significant price premium. PSD recommends them for larger installations (e.g. many simultaneous users).

**Directive on RAID configuration**

Both RAID 1 and RAID 5 can tolerate a single drive failure. Data loss occurs after a two drive failure (assuming the first faulty drive is not replaced in time before the second drive fails, or both fail at the same time), which is more likely the more disks there are. The RAID 1 array has only two points of failure whereas the RAID 5 array has 3 (with a 3 disk array, the minimum). RAID 5 is therefore less safe than RAID 1.

RAID 5 is more complex than RAID 1 - it calculates and stores parity information for data, whereas RAID 1 uses simple mirroring. An intelligent controller can consequently be faster in RAID 1 mode than in RAID 5 mode, since in RAID 1 the two drives can be used independently to perform reads from different regions. Reading a file from a RAID 5 array requires the controller to reconstruct data from multiple drives using the parity information, so parallelism is not as good. Both RAID 1 and RAID 5 require the drives to work in unison when performing writes. However, reads are generally more frequent than writes so the RAID 1 advantage can be significant - just note that not all RAID 1 capable controllers are this smart.

There are RAID 1 controllers that allow hot-swapping, so PSD does not discount RAID 1 on the basis that it negates the possibility of hot-swapping. You will probably find that most of the decent RAID 5 controllers also support RAID 1 and that their hot-swapping capability also extends to RAID 1.

RAID 5 wastes less disk space than RAID 1. The efficiency of RAID 1 with regards to disk space is 50% (since one disk is a complete mirror of the other), whereas RAID 5's efficiency is 66% with a three disk array (a three disk RAID 5 set gives the capacity of two drives). The space efficiency of a RAID 5 array goes up as the number of disks increase - but so does the risk.

To summarize: RAID 5 is more storage space efficient than RAID 1, but it is generally slower and less safe. If storage space efficiency is very important, then a four (or more) disk RAID 5 array may be enticing. Certainly a three disk RAID 5 array does not seem worthwhile. Another option is a RAID 6 array, which allows for a two drive failure. If there is a likelihood that a faulty drive may not be replaced speedily, then the threat of a dual failure is very real and RAID 6 should also be considered.

### Database Specifications

The PSD suite is designed to perform satisfactorily on Microsoft SQL Server Express or Microsoft SQL Server. The predominant choice by current users has been either of the Microsoft options. PSD (a registered partner in the Microsoft Partner Program) is licensed to distribute SQL Server Express in conjunction with its software. In designing a system the PSD Suite edition constraints must be borne in mind:

<b>Server (Database) Limitations (Compulsory)</b>	<b>Standard</b>	<b>Advanced</b>	<b>Premium</b>
Server limitations are applied at database level and are strictly enforced.			
Maximum number of client records	75,000	175,000	Unlimited
Maximum number of property register records (real estate)	100	250	Unlimited
Maximum number of telephone extension, pin and account codes	200	400	Unlimited
Maximum number of concurrent users	15	30	Unlimited
MS Express database platform	Yes (4Gb)	Yes (4Gb)	No
MS-SQL 2000 or higher database platform	No	Yes	Yes
<b>Recommended Edition Size (Guideline)</b>	<b>Standard</b>	<b>Advanced</b>	<b>Premium</b>
Edition sizes are guidelines and are not enforced by the system.			
Recommended number of booking units rooms /chalets/ villas)	1 to 200	201 to 400	Unlimited

### Directive on MS SQL Database Licensing

With Microsoft SQL being our clients database of choice we have prepared the following extracts from Microsoft's licensing expositions. Microsoft provides for two primary (non Express) MS-SQL licensing methods: device CAL and user CAL licensing. SQL Server Licensing FAQ describe the difference between the device CAL and user CAL licensing options as follows:

"...A device CAL allows any number of users to gain access to licensed server software from a particular device. A user CAL allows a particular user to gain access to licensed server software from any number of devices. In other words, a user CAL covers a particular user's access to the server software from work computers and laptops, as well as from home computers, hand held computers, Internet kiosks, and other devices. A device CAL covers multiple user's access to server software from a single, shared device..."

From the above Microsoft expositions it appears the Device Client Access License (D-CAL) is the appropriate licensing method for PSD Suite clients.

### Directive on SQL Express

Express is a limited versions of the Microsoft SQL Server. In short, it is the Microsoft SQL Server 2005 database engine with some limitations in the database size and the number of connections.

The Express database engine is free, and is distributed with the PSD Suite as small stand alone SQL servers. It is ideal for small websites and small businesses with less than 25 simultaneous users. Express is limited to 4GB of data storage space, but you can easily upgrade to a full Microsoft SQL Server without any limitations. Express databases are a good and affordable starting point for any business, organization or even home solutions.

## Networking

The PSD Suite will perform satisfactorily on the following:

### Cabling

Fibre Optic or 1000Mbps UTP (Unshielded Twisted Pair) Category 5e or 6 cabling (minimum 100Mbps). All RJ45 connector pin outs and cable colour coding to be fully compliant with testing standard TIA/EIA 568-B.1 standards for category 5e and TIA/EIA-568-B.2-1 "Transmission Performance Specifications for 4-Pair 100W Category 6 Cabling" for category 6 cabling. All switches and related devices to support either the 100Mbps or 1000Mbps throughput. Please refer to:

- <http://standards.ieee.org/getieee802/>
- [http://www.ertyu.org/steven\\_nikkel/ethernetcables.html](http://www.ertyu.org/steven_nikkel/ethernetcables.html)

### Wireless LAN (WiFi)

Wireless networking technology (WiFi), although popular for internet hotspots does not present a substitute for a reliable UTP cabling network. Wireless networks are **not recommended** for points of sale or reservations computers as they are not able to continuously sustain connections to the server. Should circumstances demand the use of WiFi, the PSD software suite requires a minimum 54Mbps continuously sustainable radio frequency link with appropriate security measures implemented.

Care should be taken to:

- implement reliable WiFi equipment which provides continuously sustainable radio frequency links;
- avoid the growth of flora or the erection of structures which may interfere with the connection between transmitters;
- avoid other WiFi devices which may interfere with the radio frequency signals.

## Data Synchronizing

The PSD suite is designed to synchronize a dataset between multiple servers across geographical boundaries. Herewith a brief overview of PSD's INNSync data synchroniser - please note that it is proprietary and does not rely on any form of database replicator such as those provided by commercial database systems.

INNSync employs a proprietary algorithm to keep multiple INNkeeper databases synchronised over any TCP/IP network, whether LAN, WAN or Internet, through a permanent connection or dial-up. All database records have a tag field that is used to identify records that have been modified by a user or that have been newly inserted into the database. INNSync extracts these records from the database in a continuous fashion and transmits only the changes that have occurred since the last synchronisation cycle. The data is also compressed somewhat to reduce network traffic.

Considering that a typical client record is smaller than 2KB and a transaction or booking record is in the region of 1KB, it is immediately apparent that the bandwidth requirement of the connection is minimal. If 20 operators were to create a new client and booking every minute, that would require a throughput of only 1KB/s to maintain synchronisation without the remote server ever lagging behind. Although the throughput requirement of INNSync is easily met by any dial-up modem connection, we do recommend an affordable permanent connection (like ADSL) to keep costs down, and also to avoid the hassles associated with dial-up connections.

### Real time synchronizing

Requires all servers to be linked to at least a 64K+ Diginet or ADSL data communication line with the appropriate switching/routing equipment. Each server must have a unique static IP address or a fixed DNS name, and sufficient resources (processing power and RAM) to support the synchroniser. Larger establishments may require a dedicated server for synchronizing purposes.

### Dial up synchronizing

Requires each server to be linked to a direct telecommunications line (avoid routing via a PBX) with an appropriate external modem. Each server to have a unique static IP address or a fixed DNS name, and sufficient resources (processing power and RAM) to support the synchroniser.

## Telecommunications

### Facsimile Transmission

PSD recommends that the FaxServer program be run on a server computer, linked to a dedicated facsimile transmission line. Although the FaxServer will perform fax serving functions in the background on any workstation on the LAN, this is not recommended in larger establishments which require mission critical facsimile management.

**DirectDial dialer facilities**

DirectDial facilities utilises Windows TAPI (telephony application programming interface) to communicate with conventional analog modems and perform dialing and communications functions. This requires an analogue modem to be installed in every computer which will utilise DirectDial. TAPI and analogue modems do not support digital PBX systems. Should an establishment require DirectDial on a digital PBX system the PBX vendor shall supply PSD with the proposed analog to digital converter, or digital modem, in order that PSD may test and certify it for use with the PSD Suite.

**Telephone call billing & management**

The PhoneManager program requires a data download cable, from the PBX system to the server. The PBX vendor shall provide the data download cable with a 9 pin D connector (RS232), which connects the PBX to the PhoneManager buffer box at the server computer. The 9 pin D connector utilises the conventional pin layout.

**Device Interfaces**

The PSD suite interfaces to any device which is supported by Control Lodginglink PTS. More than 543 devices for identification, access control, communications and client services are supported

PABX systems	133	Call accounting	108	Voice Mail	40	Keyless door locks	61
In-Room Internet	25	Pay TV & Movies	59	Mini Bar billing	22	Safes & wristbands	5
Energy Management	13						

To determine if a specified device is supported, you may go to <http://www.comtrol.com/products/supported-gss-devices/callacct>. It is the responsibility of a device vendor to certify that a proposed device is supported by Control Lodginglink PTS, or to ensure the development of an interface from their device to Control Lodginglink PTS.

**System Environment**

Customers may secure a stable and cost effective ICT environment provided they:

**Equipment, Operating System and Data**

- Maintain computers, peripheral devices, equipment and network operating systems in good working order so as to minimise incidents caused by hardware or operating system failure;
- utilise and maintain uninterrupted power supply and/or power filter devices and temperature control equipment so as to minimise software incidents caused by dirty power or overheating;
- maintain daily data archives (back-ups) to at least two different mediums other than the server hard drive, to facilitate fast data recovery.

**Trained Staff**

- Designate and train a system champion for each registered installed site;
- maintain an adequately trained staff complement to operate the software at each installed site;
- nominate the system champion and designated staff to attend regular refresher training on upgraded versions of the software.

