

Product Bulletin

Some ISS45 V8 / WinPoS Questions and Answers

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ISS45 8.4.2 is in General Release. As you know, **ISS45 V8** uses Microsoft SQL as the master system database, and provides a comprehensive graphical user interface with a full browser-style control to the **ISS45** back office.

Here are some questions and answers that have come up regarding **ISS45** Version 8 and Windows PoS technology.

What are the operating and database systems for the V8 office? 8.4 uses Windows 2000 Server for the MFS1 and Windows 2000 Professional is specified for MFS2. SQL Server is used (over Windows 2000 Server) for the database — in 8.4, SQL 2000 is used.

What about PoS? The PoS operating systems for **V8**/WinPoS are Windows 2000 Professional for TeamPoS 2000 terminals and NT Workstation for TeamPoS 5000 terminals.

Did I hear that Fujitsu just lowered the price for Windows 2000 Professional? We hope so. We have an improved Microsoft agreement that allows us to sell Windows 2000 Professional with TeamPoS 2000 for a list price of \$225, less 40%. This is a price cut of \$110.

What is the plan for Windows XP? Microsoft has a new “embedded” program for XP, and the embedded version will be available late in calendar 2002 if Microsoft’s schedule holds. This would become Fujitsu’s preferred operating system for the PoS terminals, since it will cost less and there is the potential for better performance over the same hardware than Windows 2000 Professional.

What does “embedded” mean? In the case of XP, it would be a special version of XP that has only the modules and drivers required for ISS45 on TeamPoS 2000. Everything else would be stripped off. This means a smaller technical footprint for RAM and disk, and probably better performance and faster setup. Fujitsu will also be able to offer this at a lower price than previous Windows products.

What about XP for the back office? At this point there is no “XP Server” and therefore XP is not a candidate for MFS1. Without MFS1, there seems little point in releasing a configuration with XP for MFS2.

A customer told me that IBM claims that if I buy ISS45, then I will be forced to pay Microsoft “subscription fees.” Is this true? No.

What is IBM talking about? Microsoft has announced a “Software Assurance Plan” where large corporate customers under high-volume agreements directly with Microsoft can decide to pay a certain amount per year and receive all software upgrades for free instead of buying new licenses and products when they become available.

Why doesn’t that affect my grocery customers? Your grocery customers purchase their Microsoft product from you, the Dealer, not from Microsoft. In addition, it is typically more expensive for users to purchase terminal operating systems and databases within such direct Microsoft arrangements as opposed to using the more favorable OEM and embedded pricing

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available with TeamPoS and ISS45. In the future, XP embedded should lower those costs even further.

The Server that I'll put in to run V8 will also need to run some of our applications written in-house. This will include our own databases using SQL, plus Visual Basic components, Exchange OTS (e-mail client), Microsoft Internet Services and possibly Microsoft Internet Information Server (IIS 3.0). Then we have Microsoft Message Queuing (MSMQ), and possibly Microsoft Transaction Server (MTS). In some cases there needs to be SQL replication back to our corporate host support systems via SQL's native replication engine. Some other applications must use MSMQ to reliably receive/deliver data built during off-line work sessions while scheduled or on-demand delivery will be made via a dial-up connection.

Ok, so what's the question?

Well, I need to know if any of this conflict with ISS45 V8 in any way?

ISS45 V8 software is compliant with the Microsoft and other parties' Windows software mentioned in the question, and can be run along with Microsoft back office modules without conflicts. Do not make the mistake of ignoring performance issues, however. If you want to run *all* the modules mentioned above on a single machine (even without **ISS45 V8** on the box) you will need a very powerful machine with maximum RAM, disk space and even multiple/parallel CPUs. You may well decide to divide the load between several machines – **ISS45 V8** also requires a powerful PC.

One more thing to look out for – **ISS45** is “well-behaved” under Windows, but not all other applications are. We have found through hard experience that other applications can affect **ISS45**'s proper operation by stepping on interrupts, drivers, etc.

What is the recommended server hardware for V8? The following pertains to 8.4.2:

Product	Minimum MHz	Optimal MHz	Minimum RAM	Optimal RAM	Minimum Disk (above O/S)	Optimal Disk (above O/S)
V8 8.4 MFS1 (Windows 2000 Server)	Pentium III 600 MHz	Pentium 4 1.5 GHz	256	512	10GB	20GB
V8 8.4 MFS2 (Windows 2000 Pro)	Pentium II 266 MHz	Pentium III 1.5 GHz	128	256	4GB	10GB
V8 8.4 WinPoS (TeamPoS 2000 Windows 2000 Pro)	Pentium 266 MHz	Pentium III 850 MHz	128	128/256 ¹	2GB	4GB
V8 8.4 WinPoS (TeamPoS 5000 Windows NT)	Pentium 266 MHz	Pentium III 850 MHz	64	64	2GB	4GB

In addition, the following recommendations apply:

¹ 256 MB recommended for more demanding applications, such as dual displays or use of complex promotions.

- ✓ The MFS1 server is recommended to use a RAID-5 disk array for maximum protection against storage failure.
- ✓ Uninterruptible Power Supply
- ✓ The use of Fujitsu PIN 45TSVR1 or 45MTPC is required for MFS1
- ✓ Currently, the use of Fujitsu PINs 45TSVR2 or 45MTPC are strongly recommended for MFS2

Hey! This is bigger than I remember! Weren't we talking about 166MHz units a couple years back? How do I explain this change to my customer?

Fair point. But here's reality: First, Windows 2000 and SQL 2000 are far superior to the operating systems and databases available in the past, but they have much bigger technical footprints. Second, **ISS45 V8** has been enhanced into a much more powerful and capable system than even we predicted for this point. Instead of a GUI/SQL version of V7, customer requirements have driven **V8** to have many, many more features and architectural capabilities than originally planned – in fact, **V8** is way beyond anything anybody has ever seen in PoS. Of course, the winner is the customer, but the boxes need more power.

Of course, in most cases the customers will buy new servers for the stores anyway – you couldn't buy a 166 out there if you tried.

*RAID hardware disk arrays? I've always thought that was just for high-end enterprise-rated stuff. What does that bring to the table with **ISS45 V8**?*

A RAID-5 array provides SQL data replication – that is, RAID gives remarkable protection against disk crashes. In fact, with **ISS45**'s RAID configuration, any two (and possibly three) of the four disks in the array can fail and the system will continue running without performance or data loss. With the “hot swap” capability, your data will be protected and you can continue work even while the failed disk is replaced.

In the Windows 2000 environment, a hardware RAID will also give you a performance boost and use the hardware controllers' “read ahead” features that SQL will implement. (Note that Windows 2000 Server can provide this with “mirroring” or a software “RAID” with many of the same functions but performance will suffer dramatically.)

Please see [Marketing Bulletin 1142](#) for a complete description of RAID and its relationship and benefits to **ISS45**.

*What is general database architecture of the **V8** system like, and is it really different from Version 7?*

V8's architecture is a significant enhancement from Version 7: the PoS terminals run the **ISS45** Windows PoS terminal software. The **V8** server runs the 32-bit Windows OLTP service supporting all functions while the SQL database provides the relational data system that can be accessed by standard Windows applications.

ISS45 provides Windows Active-X/DCOM table-driven interfaces between the SQL database to the OLTP system tables (no hard coded conversions) and to the PoS terminals. The **ISS45** SQL system runs on MFS1 with several workstations optionally attached. Data resilience/recovery is based on the OLTP system (complete terminal operation is supported even with not operating controllers) and the elegant RAID array makes it virtually impossible to lose system data or storage functions – three, and maybe four drives would need to fail to hamper function.

Explain V8's use of the OLTP versus SQL. Doesn't this mean that we need to maintain two different databases? No. SQL is the only true database in the **V8** system. The OLTP system has been retained from the V7 system since it provides proven, bomb-proof data communications within the OLTP system and is the core of the "never-down" architecture. Naturally, this means there are data tables within the OLTP system. But the data access to the **V8** system is purely through the SQL database.

What are the advantages of this arrangement? Users have the best of both worlds – completely industry-standard data access with SQL, ODBC and Active-X, and a lightning-fast OLTP system that has withstood thousands of installations. In addition, this means that the system does NOT rely upon SQL for client-server technology, dramatically increasing performance and stability while eliminating the need to purchase SQL clients, thereby dramatically lowering acquisition cost.

The net-net-net of this architecture is that **ISS45 V8** provides dramatically superior Replication, Resiliency and Recovery compared to other systems that use SQL or any other database in a client-server or mirrored technology without the benefit of an OLTP system.

Wasn't the original plan for the V8 office to run with the V7 PoS and vice-versa? Now it seems the customer needs to go V8/WinPoS or V7/DOS PoS. True?

True. Although with Version 7.7/WinPoS, V7 users can use the WinPoS PoS without a **V8** SQL back room, you cannot use a DOS PoS with the **V8** office.

When using Microsoft Windows 2000 do the ISS45 V8 applications run as services, or do you require a particular system administrator account to be active and logged-on?

The server modules of **ISS45** run as native Windows 2000 services – that is, they are booted and active before the user logon. It is the application part (screens, reports) with the user interface that is activated after the user has logged on. This way the PoS terminals can get the necessary controller services without an operator being logged on in the back office. This strategy is also critical for power fail and other "uncontrolled" situations. Again, the **ISS45 V8** services run under a local system account or administrator account like all Windows 2000 services, while the application modules run under the user account of the logged-on user.

In V8, any changes to the SQL need to be reflected in the internal OLTP system. How is this accomplished – triggers? – extended stored procedures? It could also be useful for the current API set to update the SQL database whenever the QDX system gets updated – but such a "double-write" could hurt system performance. Will the update to SQL Server be performed in a delayed or data-queued approach to minimize its effect on performance? If not, how will this happen?

ISS45 implements the new Active-X system by writing special ActiveX server objects to update SQL and OLTP via ODBCMT.dll and Autom2q.exe processes. The update operation to SQL is fully synchronous, while they are asynchronous to the OLTP system. The update of the OLTP from SQL is done by Active-X controls/servers that relay SQL table data to the system. Instead of a hard-coded routine, the **ISS45 V8** objects use special QDX→SQL description tables that optimize flexibility.

The **ISS45 V8** OLTP will continue to capture all data and therefore can be used for emergency store control while a catastrophic failure of MFS1 is repaired. All back office data updates

should be made to the SQL database. See [Marketing Bulletin #1118](#) for more information regarding the Active-X objects and data access capabilities.

Does ISS45 V8 have a database dump/restore process? If so, will we be able to use it to dump/restore our objects?

The current **V8** release does not have a database dump/restore process. In general when using an SQL database it needs to be determined whether it is the user or the SW supplier who is responsible for the database maintenance and support.

I have a customer who wants to implement a corporate WAN with their sites. What kind of IP conventions do we use at store level with the system? Typically, MFS1 is listed in the HOSTS file as MFS1 with an IP of X.X.X.1. Then, the first PoS is the IP of MFS1 plus 10. For example, PoS1 is then at IP X.X.X.11. POS2 is X.X.X.12, etc.

What sockets or ports does ISS45 devices use to communicate through at the IP Socket level? ISS45 PoSs and MFSs using the OLTP/RSM use UDP protocol, port 345 (for RCOPY and FC). SQL queries use TCP port 1433 or Microsoft named pipes (depending on the SQL install). Database and file backups between MFS1/MFS2 are done via standard NETBIOS ports.

What about chains that have a WAN and a full domain structure – what requirements do we have about our devices (PoSs and MFSs) for logging into that domain? Regarding domain login, the customer IT department can make the normal choices regarding standard domain/workgroup accounts. However currently the PoS and Front Office operators should be set up as machine or domain administrators – this in order to execute start/stop services, code distribution, reboot, registry write etc. In a future release, these tasks will be relocated to a Service activity, so IT departments can set up these users with regular logons. (Also, see two technical bulletins, [TECH 02:05](#) and [TECH 02:11](#) for more information about these subjects.)

If the SQL master database gets corrupted, will the lanes continue to run? Would we then be able to rebuild the databases from the OLTP? If yes, would ISS45 V8 do this automatically?

The use of RAID virtually eliminates this issue. Nevertheless, if the SQL database gets corrupted the PoS terminals will continue to operate normally because although SQL is the master system database, the **ISS45** OLTP system provides all data to the terminals in an advanced and secure fashion.

A Wizard is provided that can rebuild a store database from OLTP and the automated SQL backups (from MFS2) in the case of destruction of the MFS1 controller. Since the SQL database contains additional data, standard MIS procedure of regular off-site backups should be taken and stable hardware (with a UPS) should be used – research shows that database corruption is most often caused by hardware – including disk drive – faults.

With all this, what's the "redundancy" plan for V8? Microsoft SQL was chosen for **V8** due to it's amazing robustness and resistance to corruption. Currently, however, there simply aren't any suitable OLTP data synchronization tools for SQL. The standard Microsoft tools aren't designed to keep multiple SQL applications and tables in synch in a heavy OLTP environment such as PoS the same way **ISS45** kept its QDX files in continuous synch. The situation is supposed to improve with future releases of SQL with internal enablers for the kind of OLTP data replication required.

For the time being, **V8** uses a “biased” architecture – that is, MFS1 and MFS2 have different capabilities. MFS1 has the only copy of the master SQL files (protected by RAID, of course) as well as the QDX files. MFS2 has the same auto-synched QDX files as MFS1, using the same ultra-stable code as in V7, but the SQL client on MFS2 – while it has complete and instantaneous read/write capabilities to the master SQL files – is *accessing* these file on the MFS1 instead of working with its own (local on the same box) files.

What about using Clustering? Pros and Cons? Clustering is a technique whereby a single disk array, usually a high-performance RAID, is used and accessible from multiple servers. In this case, MFS1 and MFS2 would be essentially diskless, at least from the standpoint of data, and both would access the same disk array “centered” between them.

Although this would appear to protect against a controller failure, there are some significant drawbacks:

- You need an Enterprise version of Windows 2000 (and you thought Windows 2000 Server was expensive and had a big technical footprint...)
- The RAID array provides no more security than if it were attached to a single controller – in other words, it’s still not as secure as the “balanced” system we’re moving to.
- The MFS1 and MFS2 have to be physically within a foot or two of each other.
- The only additional protection in this case is when you have a server hardware failure not involving the disk subsystem. In current Server-spec machines, such failures are so rare as to not justify the additional cost and inconveniences specified above.

All this having been said, **ISS45 V8** has been engineered to operate on a cluster arrangement and has been tested successfully. If your customer is dedicated to a cluster architecture, this can probably be accommodated by Fujitsu with additional testing and possible tuning modifications.

What’s the “3-Rs” story on the V8 Controller Service? How do you restore an ISS45 V8 system where the MFS2 has had a catastrophic failure and you have to rebuild the whole thing?

- First, remember that **ISS45 V8** has the master SQL tables on the MFS1 RAID machine only, but that the “internal” QDX tables are located on both the MFS1 and MFS2 machines in the traditional “balanced” mode. This means that the QDX files in MFS2 are always up-to-date.
- For MFS1 to have the catastrophic failure described, at least three disks of the four-disk RAID array would have to fail or be unavailable due to a complete failure of the server itself.
- At every End-of-Day, MFS1 sends the complete SQL database to MFS2 for backup. This way, the complete database of SQL files is never more than 24 hours old. We still recommend the standard MIS practice of regular off-site backups for the in-store data, but the full SQL backup on MFS2 provides the core recovery capability.
- MFS2, of course, has an up-to-the-second copy of the QDX transaction log. But MFS2 also retains an updated copy of the SQL T-Log. Every fifteen minutes, MFS2 gets the T-Log updates from MFS1, so SQL T-Log in MFS2 is never more than a few minutes. (A parameter can make these updates one hour apart if desired.)
- If MFS1 is “unplugged” the terminals continue to send the transactions to the **ISS45** Controller Service as usual. In this case, MFS2 keeps all the tables updated, including the QDX T-Log, while MFS1 is asleep. This way, the terminals are not running off-line, and the QDX T-Log is always current.

- When it is time to recover MFS1, **ISS45** provides a Restore Wizard to rebuild MFS1. This process takes the complete SQL backup from MFS2 (from the last EOD), then adds the SQL T-Log that MFS2 maintains (remember that this T-Log is at most 15-minutes old). Finally the QDX T-Log entries since the last SQL T-Log update are added/converted over to the SQL database. The final step automatically processes the rebuilt SQL T-Log through the system to update last night's SQL tables for movement, sales, etc.

When the MFS1 is off-line, how do we accomplish an emergency price change?

This can be accomplished by using the QDX maintenance screens (like Version 7) on MFS2. This will execute the price change throughout the system.

If hope you've received the impression that **ISS45 V8** puts some pretty impressive architecture at the service of your customers. So get ready to run with the big dogs.

To Your Success,

Tony

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