

Questions and Answers About ISX

1. <i>What is ISX?</i> _____	1
2. <i>Why should we use ISX?</i> _____	1
3. <i>Is ISX complicated to install?</i> _____	2
4. <i>How is performance affected when DPPX runs as a Guest under OS/390?</i> _____	2
5. <i>How does ISX compare to VM and LPAR?</i> _____	2
6. <i>What about security?</i> _____	2
7. <i>What benefits can DPPX users realize from using ISX?</i> _____	2
8. <i>Will ISX allow elimination of out-of-date hardware?</i> _____	2
9. <i>Will technology available to DPPX applications be stuck in the dark ages?</i> _____	3
10. <i>How is system scalability affected?</i> _____	3
11. <i>How do I deploy new DPPX systems?</i> _____	3
12. <i>Will I be able to consolidate servers?</i> _____	3
13. <i>Can I use modern DASD technology instead of FBA disks?</i> _____	3
14. <i>How is the performance of FBA disks affected?</i> _____	3
15. <i>How does ISX affect DPPX storage capacity?</i> _____	4
16. <i>What technology improvements will DPPX realize through OS/390?</i> _____	4
17. <i>What system level technology improvements will be achieved?</i> _____	4
18. <i>Can OS/390 applications be run using DPPX data sets?</i> _____	4
19. <i>What networking facilities are available to the guest DPPX system being executed under ISX?</i> _____	5
20. <i>Is it possible to use TCP/IP networks for guest DPPX systems?</i> _____	5
21. <i>How do you start using ISX to create DPPX guests under OS/390?</i> _____	5
22. <i>What are the system requirements to run a DPPX guest on an OS/390/ISX system?</i> _____	5
23. <i>What virtual networking facilities are available for networking different types of guest systems?</i> _____	6
24. <i>Is ISX Y2K compliant?</i> _____	6
25. <i>Is it possible to use DPPX/ISX on SYSPLEX?</i> _____	6
26. <i>Is it possible to use older devices that are not supported in OS/390 in a DPPX/ISX environment?</i> _____	6
27. <i>How reliable is the DPPX/ISX/OS/390 environment when compared to the reliability of DPPX execution on its native hardware?</i> _____	7

Questions and Answers About ISX

1. What is ISX?

A. ISX is an OS/390 program that creates a virtual 370 or 390 machine at the OS/390 level. Any operating system (except VM/ESA) and its applications can be executed in this virtual machine. Independent virtual machines using different operating systems (DPPX, VSE) may be running simultaneously as OS/390 tasks. Therefore, the OS/390 functionality is accessible to other systems. ISX has virtualization capabilities for disks, networks, and terminals, which makes it possible to transfer the processing to other geographic locations.

2. Why should we use ISX?

A. ISX has economic benefits for businesses using OS/390.

- Income is increased due to the fast and inexpensive organization of outsourcing (provides ability to perform IT functions for other businesses);
- Expenses are decreased when IT functions are consolidated on OS/390 (transfer DPPX, VSE, MVS to OS/390). Fewer machines and less maintenance will be necessary.
- ISX can be used for a one day migration to OS/390. ISX will create a common equipment environment for heterogeneous systems.

3. Is ISX complicated to install?

A. No! If you are already running OS/390, you are probably ready to install it today. Additional resources and deep staff experience are not necessary to install or run ISX. The ISX user's guide and reference is about 59 pages (including error messages).

4. How is performance affected when DPPX runs as a Guest under OS/390?

A. Three occurrences cause a marked improvement in performance.

- DPPX input/output is organized by OS/390, and modern disks and channels are used.
- Dozens of outdated computers may be removed from processing. Simultaneous execution of multiple virtual DPPX can be performed on a single 9672 under OS/390.
- OS/390 sees DPPX and its applications as a task, so there are no overhead costs. DPPX transaction rates correspond to OS/390 transaction rates.

5. How does ISX compare to VM and LPAR?

A. Since ISX is a subtask of OS/390, all of the performance features and functions of OS/390 are available to ISX guest systems. This includes exploiting multiple processors and I/O subsystem throughput. ISX also

Questions and Answers About ISX

provides emulation of older unsupported devices. There can be many ISX tasks (guests) running simultaneously in a single OS/390 system.

An LPAR provides a hardware shell to run an operating system. Depending on the processor model, you are limited to between 7 and 15 LPARs on a single processor. The LPAR does not provide any of the rich performance functionality of an OS/390 system.

A VM system is another operating system with all of the associated overhead, such as hardware resources, maintenance and cost. VM's performance demands are far higher than ISX, and the emulation capability of older unsupported devices in VM is limited. Since ISX is a software product instead of an operating system, the installation and maintenance is easier. OS/390 is much more efficient than VM in processor utilization and I/O throughput. Therefore, the performance of an ISX guest under OS/390 will show dramatic improvements over the same guest in a VM system.

6. What about security?

- A.** ISX runs as an OS/390 task, so security corresponds to the security level of an OS/390 task. SAF and RACF could also be used for the guest system tasks, that can improve the security level on the guest DPPX and VSE systems in comparison to their initial security level. ISX is actually the access dispatcher, therefore, an exceptionally high security level could be assigned to any guest system.

7. What benefits can DPPX users realize from using ISX?

- A.** DPPX systems can quickly be consolidated under a single OS/390-ISX system. The DPPX systems will realize performance improvements from executing as an ISX guest under OS/390. ISX will exploit modern technologies, such as newer DASD, which are not normally supported under DPPX. DPPX will realize the benefits of this newer technology transparently.

8. Will ISX allow elimination of out-of-date hardware?

- A.** Yes! Supporting up-to-date OS/390 equipment and out-of-date equipment running DPPX will no longer be necessary. Running DPPX as an OS/390 task uses the OS/390 hardware. You will not need to support the out-of-date equipment. With the large scale processing capabilities of the 9672 processors, many older DPPX systems could be consolidated under a single OS/390 system resulting in improved performance and decreased maintenance costs.

Questions and Answers About ISX

9. Will technology available to DPPX applications be stuck in the dark ages?

- A.** No! Development for DPPX was stopped long ago, but OS/390 technology is continuously improved. Critical OS/390 features, such as backup, disaster recovery, networking, and security already surpass the DPPX technology, and this superiority will just increase in time. These OS/390 features will be available to DPPX since ISX causes DPPX to play according to OS/390 rules.

More than just technology is affected by ISX. A considerable part of the former DPPX activities will be performed by OS/390. Maintenance personnel will not need skills in DPPX any longer, which may result in decreased expenses at the staffing level.

10. How is system scalability affected?

- A.** DPPX system dependence on out-of-date hardware currently limits the scalability of applications in the following areas:
- Performance;
 - Main memory and DASD capacity; and
 - Throughput of net equipment.

By transferring DPPX systems to OS/390 and newer hardware such as 9672, RVA, OSA-2 and 2216, practically all the system scalability limits disappear. As the hardware resources are scaled, the DPPX guest resources will be scaled accordingly.

11. How do I deploy new DPPX systems?

- A.** As the enterprise grows, there may be a need to deploy new DPPX applications on a new node. Without ISX, that is virtually impossible due to the lack of the required equipment and hardware. ISX solves this problem in two ways. You can:
- Create the new DPPX node on an existing OS/390 system that is already available in the enterprise.
 - Create the DPPX physical node on newly purchased hardware and a newly deployed OS/390 system.

12. Will I be able to consolidate servers?

- A.** Yes!

The availability of API UNIX and NT in OS/390 allows the transfer of processing from any boxes with UNIX and NT to the box with OS/390.

The availability of ISX's virtual 370 or 390 machines allows the transfer of processing from any processors with DPPX, VSE, and MVS to the processor with OS/390.

Questions and Answers About ISX

ISX includes the LRTE function, which makes it possible to operate OS/390 from geographically remote locations. This function enables emulation of local terminals (non-SNA) on remote terminals (SNA). You may even IPL the virtual operating system from a remote geographic location using ISX.

Processing can be consolidated in a central location, but users and system operators can be geographically dispersed.

13. Can I use modern DASD technology instead of FBA disks?

A. Yes! ISX allows DPPX users to place virtual images of FBA disks on OS/390 VSAM files. These VSAM files can reside on any modern disk technology available to OS/390 today.

14. How is the performance of FBA disks affected?

A. When DPPX is an OS/390 guest, OS/390 executes the input/output from VSAM files containing virtual FBA disks. OS/390 will exploit the improved performance of ESCON and FICON channels, even though these channel types are not supported by DPPX. The modern disks used by OS/390 offer higher performance than FBA disks.

The virtual images of the FBA disks (VSAM file capacity not more than 200-400 GB) could be located in the cache of the modern DASD units, which could have a cache capacity of several GB. In this case, all of the I/O for the DPPX guest could be retrieved from cache.

There are other possibilities to increase performance. The number of VSAM files that could be used for DPPX FBA disks is over 11,000, which considerably exceeds the physical possibilities to connect FBA disks. Each of the DPPX data sets that are critical to performance could be given their own independent VSAM file (virtual image of FBA disk). The result is that the DPPX applications are able to process critical data sets in parallel and independently. Generally, the transfer of DPPX I/O to modern technologies leads to performance rates drastically exceeding former values.

15. How does ISX affect DPPX storage capacity?

A. The growing volume of corporate data and applications has pushed the DPPX physical storage capacity to its limit. These limitations depend upon the capacity of the FBA disks (200-400 MB on cluster, depending on the model) and the physical limitation of the number of clusters being connected.

Over 11,000 VSAM files could be connected to DPPX logically, so the number of virtual FBA disks that corresponds to this number could exceed the number

Questions and Answers About ISX

of physically connected FBA disks by a factor of 100. One DPPX guest could realize a 100-fold increase in storage capacity.

Prior to ISX, to overcome DPPX storage capacity limitations, additional processor and hardware had to be purchased to ensure sufficient resources were available to support all executed applications. With ISX, additional guests can be generated and configured to simulate what was previously done physically without the purchase of additional processors or hardware.

The use of ISX and VSAM files for emulated FBA disks will overcome the current storage capacity limitations.

16. What technology improvements will DPPX realize through OS/390?

A. The DPPX cluster will be located in VSAM files, which are available for multitudes of technological operations through OS/390. ISX creates a new level of interaction between DPPX technologies and OS/390 technologies, such as the coexistence of systems and applications.

17. What system level technology improvements will be achieved?

A. The following OS/390 technologies could be used for the VSAM files (house the guest DPPX cluster):

- Storage on most modern devices, such as robotics, archive libraries, optical disks, and interaction with UNIX processors.
- Use of OS/390 middleware or utilities for support of backup and disaster recovery.
- Transfer of the virtual FBA DPPX cluster (VSAM file) using the OS/390 network facilities VTAM and TCP/IP.
- Use of RACF and DCE OS/390 security for storage and messaging.
- Sharing the virtual cluster by several DPPX and OS/390 systems.

The sharing of clusters can change the method of data exchange between DPPX systems. It will be possible for the virtual DPPX systems to have shared access to the virtual clusters. This removes the need to exchange/transfer files via a network (either physical or virtual).

18. Can OS/390 applications be run using DPPX data sets?

A. Yes! As soon as the guest DPPX cluster is visible from OS/390, it is possible to work directly with DPPX data sets using OS/390 applications.

19. What networking facilities are available to the guest DPPX system being executed under ISX?

A. All current DPPX networking facilities are available under ISX. However, additional improvements in networking become possible.

Questions and Answers About ISX

- DPPX can use newer devices such as OSA-2, 3172, 2216, by using the VICA TRN product.
- All guest DPPX systems in a single OS/390 system can communicate through a virtual TR network without the use of a physical network. ISX uses OS/390 cross memory services for emulating network connections (VTRN product).
- It is possible for guest DPPX systems in different OS/390 systems to exchange data via a virtual network. This is accomplished by using the LU 6.2 communications protocol in OS/390.
- OS/390 VTAM SNA terminals can be used to access the guest DPPX systems. This would allow for the remote IPL of the guest system from an OS/390 SNA terminal (LRTE product).

The overall networking improvements are:

- DPPX guests share OS/390 networking hardware dynamically.
- The use of cross memory services for virtual network communication reduces physical network traffic, which decreases physical resource usage and improves communication speeds.
- When a DPPX host becomes a guest of an OS/390 system that is in a different geographic location, all DPPX terminals at the original location can be replaced with SNA OS/390 terminals. Users retain full access to the DPPX system as well as gain access to the OS/390 system.

20. Is it possible to use TCP/IP networks for guest DPPX systems?

A. Yes! For example, guest DPPX systems would need to be connected via APPN over a TR network to an OS/390 system running TCP/IP. All TELNET sessions to the OS/390 system can access the DPPX guest as a local non-SNA DPPX terminal (LRTE product).

21. How do you start using ISX to create DPPX guests under OS/390?

A. Creating DPPX/ISX/OS/390 environments under standard conditions takes no more than one day! The process that follows assumes an OS/390 system has been installed and is running in an LPAR.

- Install the ISX product.
- Use ISX utilities to prepare the VSAM files to be used as emulated DPPX disks.
- Start ISX as an OS/390 user job. After this step, ISX facilities perform the IPL of DPPX, and it is possible to begin the application load.
- Restore the actual DPPX disks into the emulated disks (ISX prepared VSAM files).
- Code the control cards for DPPX configuration and I/O device allocation.
- Prepare the ISX job for DPPX execution including the control cards prepared above.

Questions and Answers About ISX

- Submit the prepared ISX job.

When loading additional DPPX systems, an ISX job must be coded for each DPPX guest of the OS/390 system.

22. What are the system requirements to run a DPPX guest on an OS/390/ISX system?

A. The system requirements are:

- Main storage – 16 to 64 MB for each guest DPPX;
- Disk capacity – from 200 to 400 MB (depending on the type of emulated disks) for each FBA cluster connected to DPPX;
- One TRN connection via OSA-2, 2216, or 3172 network devices;
- One optional TRN connection to OS/390, if network communication with OS/390 is required;
- SNA Terminals – for LU0 and LU2 applications;
- LU6.2 Terminals – for APPN network.

Full functionality could be implemented on the following test configuration:

- TRN with three OSA-2 ports
 - One port to one guest DPPX;
 - One port to the second guest DPPX;
 - One port to OS/390 VTAM.
- Three personal computers with PC COM
 - DPPX application terminal;
 - DPPX console
 - ISX console
- For a remote test, TRN with a 2210 router for exit to SDLC and connection of remote components.

23. What virtual networking facilities are available for networking different types of guest systems?

A. At the present time, the two types of virtual networking facilities available in ISX (address space to address space using cross memory services) are Virtual TRN and virtual Channel-to-Channel Adapter (CTC).

The VTRN product virtualizes the following physical network configuration: one or more DPPX or VSE systems are connected via ICA TRN to a physical Token Ring Network. Since the ICA TRN, is supported in both DPPX and VSE systems, any number of these guest systems are able to communicate via the virtual network (address space to address space) without the use of the physical network.

The product VCTC virtualizes the physical connection between the operating systems via a CTC adapter. Since the CTC, is supported in both OS/390 and VSE systems, any number of these guest systems are able to communicate via

Questions and Answers About ISX

the virtual CTC (address space to address space) without the use of the physical network.

A guest system can use VTRN and VCTC simultaneously to communicate with different systems on the same virtual network.

The virtual network capabilities allow for extensive intercommunication between systems without the use of a physical network.

24. Is ISX Y2K compliant?

- A.** The ISX product is Y2K compliant, as is DPPX and OS/390. There may be a concern with DPPX applications, leaving you with three alternatives:
- Redesign the applications so they will operate under any system;
 - Update the DPPX applications to rectify the Y2K errors;
 - Use some temporal solutions in the form of static or dynamic time windows.

ISX offers options to implement the time windows and test the guest systems.

The two functions in ISX that allow the operation of guest systems are VDAT and VTIME. The VDAT function allows the input of any date separately for each guest DPPX. This allows parallel testing of many systems, or one system based on several methodologies simultaneously. VTIME gives the capability to speed up the virtual time for the guest DPPX, which accelerates testing and creates a mechanism for the long-term forecast of system behavior related to the time.

25. Is it possible to use DPPX/ISX on SYSPLEX?

- A.** Yes! ISX and its associated guest systems appear to OS/390 as tasks. Since ISX and the associated guests are tasks of OS/390, there is no difference between execution on a single machine or in a SYSPLEX environment. ISX does not use any SYSPLEX-related facilities directly.

26. Is it possible to use older devices that are not supported in OS/390 in a DPPX/ISX environment?

- A.** Yes! Non-emulated devices that are supported by the guest system, but not OS/390, must still be defined to OS/390 using the DUMMY parameter when coding the IOCDs definition. The input/output with these devices is supported by the guest system. The result is an integral environment where the older devices are supported by the guest system, and the newer devices are supported by OS/390.

Questions and Answers About ISX

As an example, if the DPPX/ISX/OS/390 environment is run on a 9221, the old FBA disks (not supported in OS/390) and the new RVA via ESCON (not supported in DPPX) will be simultaneously accessible by the guest DPPX.

27. How reliable is the DPPX/ISX/OS/390 environment when compared to the reliability of DPPX execution on its native hardware?

- A.** The reliability of the equipment by itself and the architectural reliability of the DPPX/ISX/OS/390 environment both need to be considered.

The modern equipment available for a DPPX/ISX/OS/390 environment is undoubtedly more reliable than the DPPX hardware.

As a whole, the reliability in the environment created by ISX is higher than the native DPPX environment.