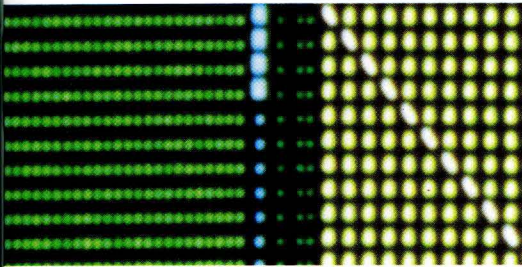


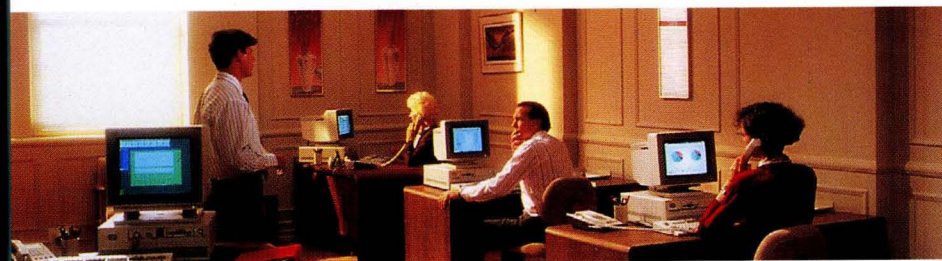
IBM Enterprise Systems Connection Architecture

The path for growth





**System resources
increase without
impairing operations
unduly**





Overcoming limitations with ESCON

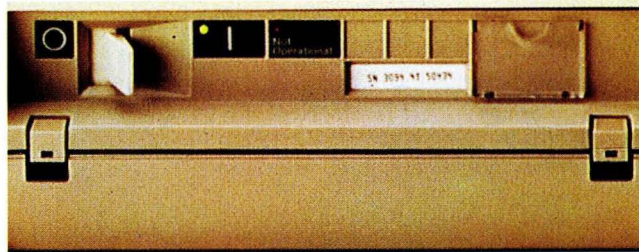
Data centre managers are struggling with increasingly difficult problems. As the demands for system availability and growth change dynamically, the constraints of networking technology stay the same.

That leaves data centre managers to contend with:

- The weight, bulk and limited range of bus-and-tag copper cabling, even though their computer rooms are at bursting point
- The maintenance of individual and static connections between each processor channel and each I/O control device, even during continual reconfiguration requirements
- The need to exchange data among computing systems that use different protocols, even when connectivity is costly or difficult
- The mandate to protect investment in existing hardware and software, while at the same time seeking new application solutions to meet business needs.

What data centre managers need are immediate solutions. Solutions that allow their enterprise data centre resources to grow, while causing minimal disruption to users. Solutions that help reduce the costs and complexities of managing resources dynamically and automatically, while ensuring continuous availability. And solutions that provide a migration path to new applications and future technologies while maximising return on existing investments.

Fibre optics allow completely new configurations and eliminate many limitations of copper cabling



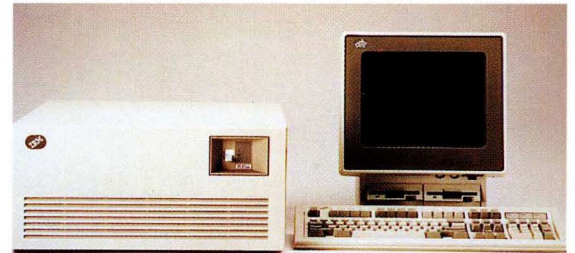
Bringing new technology within reach

IBM Enterprise Systems Connection Architecture (ESCON) offers comprehensive solutions to the data centre manager's problems. IBM ESCON eliminates the limitations of bulky cabling, affording more flexibility for unhampered growth. It helps control spiralling staff costs and safeguards investments in existing I/O resources. And, just as important, it provides new opportunities to broaden the scope of your data centre – and manage it better.

The IBM ESCON offering currently comprises:

- Processors with optical fibre serial channels – Enterprise Systems Architecture/390 (ESA/390) serial channels on the new IBM Enterprise System/9000 (ES/9000)* processors, and on IBM Enterprise System/3090* Model J processors; distances between channels and control units have been increased from 122 metres to 3 kilometres as a direct link, up to 9 kilometres with ESCON converters described below
- Optical interface control units – IBM 3490 Magnetic Tape Subsystem and IBM 3990 Storage Control for attachment to ESA/390 serial channel via adapters

- Dynamic connectivity products – IBM ES Connection Directors (ESCD) for dynamically variable interconnections among multiple optical interface channels and control units
- Network interconnection products – IBM 3172 Interconnection Controller and IBM 3174 Establishment Controller for access to other common or standard communications protocols.
- Time synchronisation and remote control – IBM Sysplex Timer for synchronising time-of-day clocks among processors and ESCON Monitor, a central facility for controlling power sequencing, monitoring environmental conditions and initiating event processing.



The new ESCON devices bring the advantage of optical fibre serial channels within reach

- Software – IBM ESA system control program (operating system) required in each processor, IBM ESCON Manager (ESCM) for environments containing two or more ESCDs, IBM ESCON Supervisor (ESCS) and IBM ESCON Fault Isolation
- Fibre optic products and services – jumper cables, distribution panels, connectors and IBM services to assist in installation
- IBM Enterprise Systems Connection Converters (ESCC) which provide migration paths for parallel processor channels and I/O control units.



Extend the
range of your
data centre
without taxing
your machine
room

Gain cabling flexibility and space in your computer complex

IBM ESCON provides a new foundation for data centre growth. Built on the principles of serial fibre optic technology, ESCON introduces a new I/O interface – a fibre optic channel that supports a range of dynamic connectivity products and service offerings.

The fibre optic channel comprises a light-emitting diode (LED) light source, a flexible silica glass filament as transmission medium, and transmitters and receivers that convert light to and from an electrical signal. With its smaller size and weight and its greater physical flexibility over copper cabling, fibre optic cable dramatically reduces the amount of space required for computer room cabling.

Increase logical connectivity with dynamic switching

An integral part of ESCON is the ESCON Director (ESCD), an any-to-any switching device that provides dynamic point-to-point switching between fibre optic channels and attached control devices. The new any-to-any topology allows the same connectivity to be achieved with fewer channel links, thus saving channel hardware.

The ESCDs receive and transmit data so you can greatly increase the distance – up to 9 kilometres – between your host computers and remote I/O units, depending on device type. The ESCD Model 2 is a floor-standing unit that comes with 28 channel ports as standard – and you can upgrade easily in 4-port increments to a total of 60 ports. For networks with fewer connectivity requirements, the table-top ESCD Model 1 offers many of the Model 2's features in an 8-port configuration that's upgradeable to 16 ports.

Effectively monitor, control and automate data centre connections

ESCON implementation enables ESCDs to establish and remove dynamic connections between host computers and control units. IBM ESCON Manager (ESCM) is a software tool that monitors and controls ESCD connections – even for ESCDs located remotely from the ESCM host. It provides a central point of control to help manage enterprise data processing resources that are interconnected by ESCDs.

IBM ESCM:

- Provides host control and coordination of one or more ESCDs
- Automates planning and operating tasks



- Allows network reconfiguration to be non-disruptive
- Helps towards continuous availability
- Facilitates automated network operations when used with IBM NetView* network management software.

Easily migrate from copper cabling to fibre

ESCON lets you take advantage of the benefits of the serial optical environment gradually. With IBM ESCON Converters (ESCCs), you can migrate to fibre as your needs change. The ESCC Model 1 enables your existing control units and their I/O devices with System/370 interfaces to attach to new IBM ES/9000 or ES/3090 Model J via ESCON channels.

And the ESCC Model 2 lets you attach IBM 3990 Model 2 and 3 Storage Control Units with ESCON adaptors to existing processors with parallel channels.

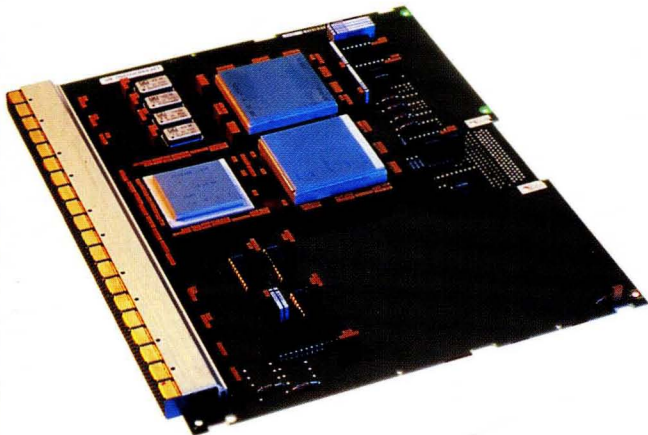
Gain power and performance as you upgrade with serial optical technology

Boost processing power with new system platforms

IBM ESCON products work with the new IBM ES/9000, and most ES/3090 J models. These processors have optional serial channels so you can begin using ESCON products immediately.

Move up to a new I/O interface architecture

ESCON is supported by IBM Enterprise Systems Architecture (ESA), which spans all the ES/9000 processors to provide extended addressing, expanded storage and a new I/O subsystem architecture for System/370 users. The I/O architecture supports a non-synchronous protocol and serial data transfer –



giving faster and more efficient data transfers between the processor and I/O device.

Use fewer channels to serve a greater number of control units

With ESCON, you can attach one ES/3090 Model J or ES/9000 serial channel to multiple I/O device control units – or one control unit to multiple serial optical channels. That way, you can achieve the required connectivity with far fewer links and much less cable – and you'll gain valuable space under the machine room floor.

Manage processors from a single point of control

To manage several IBM processors and systems in the ESCON environment, IBM developed the concept of the Sysplex (SYStem comPLEX). With its innovative Sysplex Timer, Sysplex provides a means to synchronise processor system clocks with an external time source. So you get consistent time-stamping in transaction processing applications and in distributed environments. And with the Cross System Coupling Facility (XCF), Sysplex provides a foundation for managing multisystem communications by effectively linking separate systems.

Add connection capabilities without sacrificing productivity

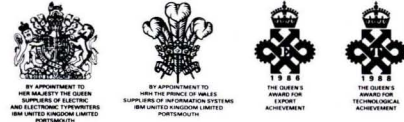
ESCON helps you manage changes, even when you add users or devices, or increase the volume of information processing. Flexible reconfiguration capabilities let you expand your data centre without affecting the productivity of your users.

I/O connections can be made without a power disruption, so new hardware can be added immediately. What's more, backup components can be integrated into your facility without requiring you to move units or cables, so installation time can be greatly reduced. That makes ESCON highly cost-effective and helps you improve the overall efficiency and usefulness of your network.

Extend your network to multivendor environments

ESCON provides an interface between ESA/390 or System/370 systems and other industry standard protocols. With the IBM 3172 Interconnect Controller, channel connection to a wide range of IBM and other industry-standard Local Area Networks (LANs) is possible.

The 3172 also allows data processing centres to be linked by high-speed communications lines with interconnection of remote mainframes over wide area networks.



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