

IBM

IBM System/38

Equipment and Programs





## IBM System/38— New levels of simplicity and economy

System 38 employs advanced computer technology to provide functions normally associated with larger more expensive systems at new levels of simplicity and economy.

Simplicity of operation is fundamental to System/38, not just for user departments, but for programmers and computer management — in fact for all the company.

Simplicity is achieved by incorporating much that may previously have been considered programming into the machine. The 'machine' in these terms is a combination of high technology computer hardware and microcode.

Built into System/38 are many of the routines normally required in a program, for example, where information is stored, how it is retrieved, who can use it. This, together with the IBM Control Program Facility and system utilities, leaves only the application logic (the relationship between information and its logical flow) to be provided by your programmers, and even this may be available via IBM application programs.

### The benefits are far reaching:

- As the machine now contains the programming routines that are specific to particular devices, your application programs are more independent of the hardware.
- Application programs are easier and faster to implement because so many functions, hitherto part of programming, are provided by System/38. For instance:
  - Protecting information from uncontrolled updates issued by multiple users
  - Controlling a variable number of terminals all doing the same job, whether locally or remotely attached
  - Describing how and where company information is stored in the system.

IBM System/38 as a minimum system for today's needs . . .

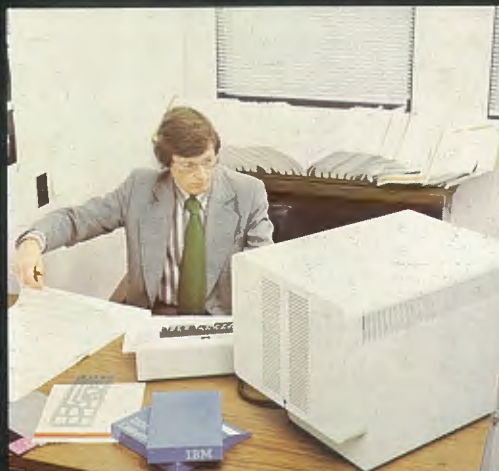
These basics are now available through IBM product functions and should be of considerable assistance to your programmer. This should allow him to concentrate on turning the user's business needs into application logic and therefore write programs much faster – which in turn could mean that your investment is paid back sooner and other application areas developed earlier.

- Members of your departments can be trained to use display stations to assist them in their work, using a copy of real company data, so that training should be accomplished more efficiently and speedily using System/38 test facilities.
- Business information can be displayed by authorised users at any workstation, analysed and printed out using a simple query facility that any intelligent person (with no previous computer experience) should be able to handle after only a few days training.
- Many different departments can process their work concurrently via multiple display stations as and when they wish, without being affected by the existence of other user departments – and without needing the assistance of the computer department!

System/38 is the most recent in a long line of IBM innovations. Without doubt it is an extremely significant computer against which it is expected that other systems will be judged for many years to come.



... expanded considerably for tomorrow's



### User view

- Easy to use
  - Menu prompting
  - Easy-to-read screens
  - Many screen facilities
  - Powerful query facility
  - Online training facilities.
- Efficient to use
  - Many applications run at any time
  - One central source of up-to-date cross-departmental information
  - Presentation on request of selected, pertinent online data at any time
  - Access to any machine resource.
- Secure to use
  - Authorised access only
  - Protection of information features.

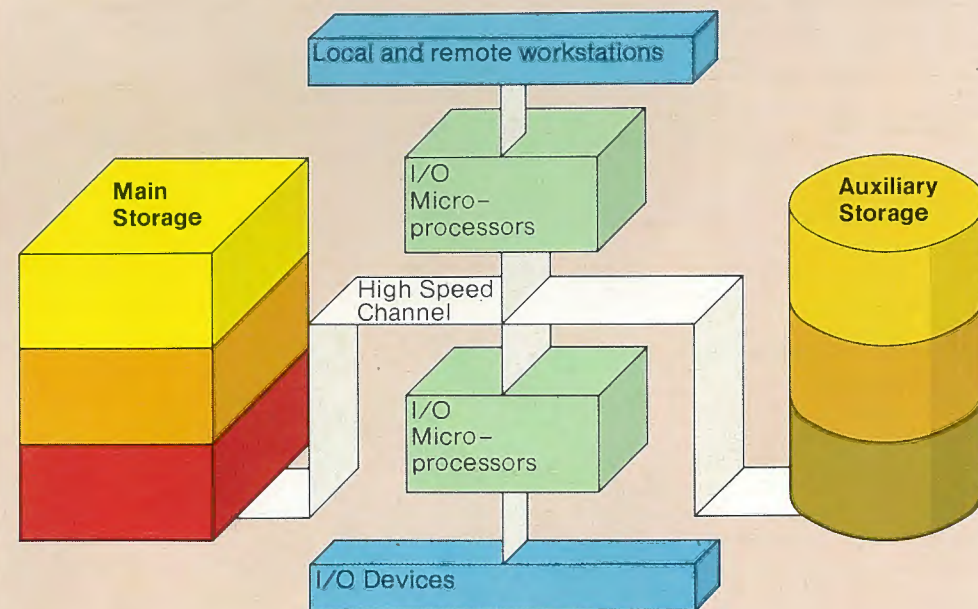
### Programmer view

- Full online program writing and in-flight debugging facilities.
- Programmer codes only application logic and information flow.
- Storage management techniques allow programmer to ignore traditional storage limitations.
- Central data base minimises tedious jobs by:
  - Reducing program maintenance
  - Externally defining data specifications once only and thus reducing the lines of code in programs
  - Removing the necessity for sort programs.

### Management view

- Economical growth by onsite upgrade. Greater independence of hardware and application software enables the system to be expanded with minimal disruption.
- Programmers should be more productive:
  - Applications go live faster
  - New tasks are integrated quicker
  - Investments are paid back sooner
  - Less time is spent on maintaining existing programs.
- Company information can be made to be secure at all levels, for example:
  - Storeman only knows stock quantity
  - Clerk also knows cost
  - Supervisor also knows gross profit
  - Executive also knows the net profit.

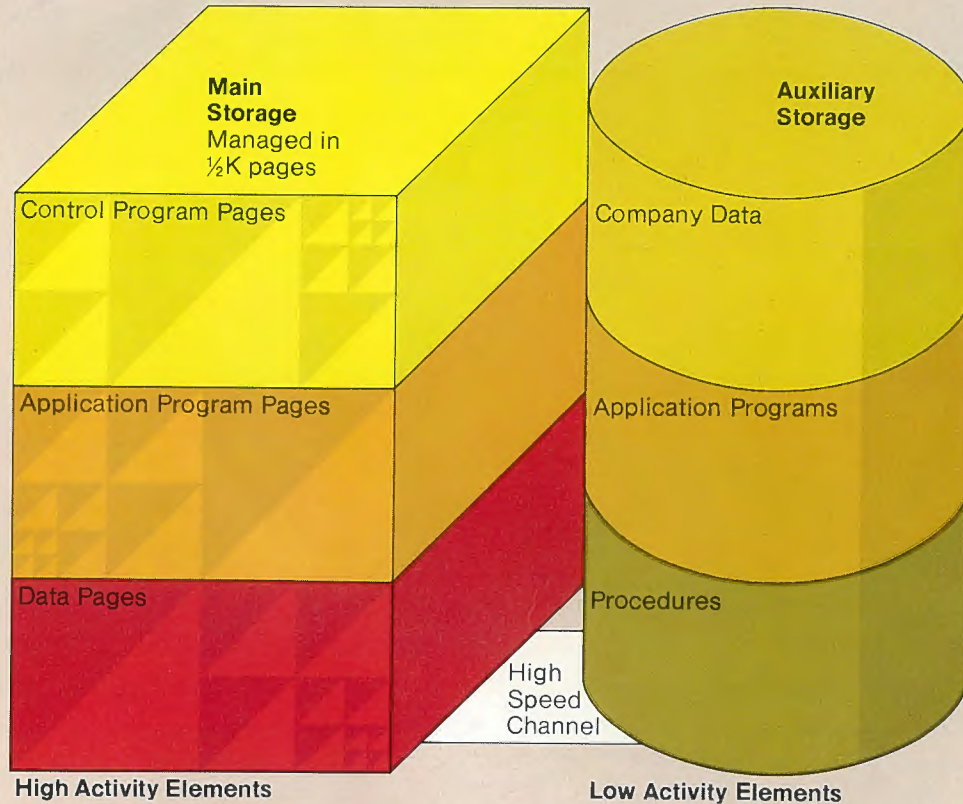
### Input/output management



Many input and output operations in System/38 are under the control of a range of microprocessors. These pass information via a high-speed data channel (a supplementary processor) to the central processor.

Concurrent operations of all these processors removes from the central processor the major portion of ancillary processing normally associated with an advanced computer system that controls multiple local and remote workstations. Thus the central processor is able to handle larger volumes of useful work.

## Storage management



System/38's storage is based on a Single Level Storage approach, where main storage and auxiliary disk storage are treated as one.

With System/38, main storage is no longer used to store only operating system routines, application program instructions, data buffers, and portions of file indices. Instead, it now contains *all* elements that currently have a high activity – including data, for example, stock items in a major promotion or special discount table.

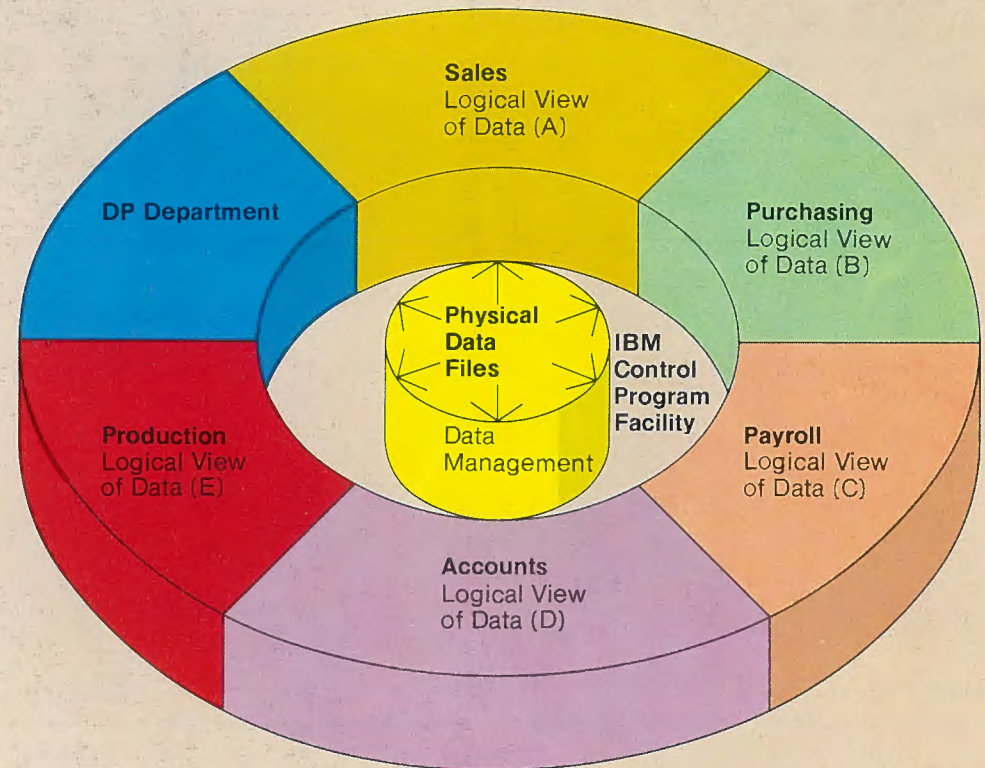
Historically, this information has normally been stored on disk, thus slowing down activity in the processor because each record could take about a thirtieth of a second to access – a significant time-span in a processor that can handle hundreds of

thousands of instructions per second. (System/38 might well store these in main storage if usage on them is heavy.) This allows faster screen responses when heavily loaded with multiple-users by configuring main storage sizes to accommodate:

- High activity application program pages
- High activity data pages
- High activity language compiler pages
- High activity operating routine pages.

All of these high activity elements can be stored in main storage which may range from 0.5 megabytes to 2.0 megabytes. All system resources are available to all users regardless of the amount of main storage selected. However, performance will be dependent on the relationship between the size of main storage and system workload.

## Data management



- The physical storage location and organisation of information is handled by System/38.

- Information can be made available in different formats and sequences for different jobs. For example:

Physical stock file	Item No.	Description	Quantity on hand	Quantity on order	Supplier No.
Physical supplier file	Supplier No.	Supplier name	Item No.	Unit cost	Quantity on order

Production control			Buyers		
Logical view (file) of information to investigate cost variations between different suppliers.			Logical view (file) of information to review all items on order from supplier.		
Item No.	Supplier name	Unit cost	Supplier No.	Item description	Quantity on order
Sequence=Item No.			Sequence=Supplier No.		

- Each department selects only the items of information it needs in the sequence required, from one set of physical data files.
- Using the data base facilities, new formats and sequences of data (logical files) can be created interactively at any time – *without affecting* existing formats.

- Changes to physical files, in most cases, will not affect existing programs.
- Application programs need only indicate the logical name given to the information they require. System/38 fills in the details from the central library of logical files.



### IBM 5381 System Unit

- High performance, programmable processor.
- Allows multiple jobs to be processed concurrently.
- Multiple microprocessors control all peripheral functions.
- Machine concept includes in the system unit hardware many functions normally handled by DP staff to preserve simplicity in an advanced computer.

### Auxiliary Storage

- Stores large amounts of business data.
- Provides virtually instant access to stored information.

### Console Display/Keyboard

- Used by Systems Operator:
  - to control System/38 functions
  - as a service station for diagnostic checks
  - as a system control station.
- Full alphanumeric keyboard.
- 1024-character screen.

### Diskette Storage

- The Diskette Magazine Drive enables swift creation of low cost security copies of essential data, which can be stored off-site on inexpensive, reusable diskettes.
- Three data formats are supported.
- Can select diskettes from up to two magazines (each contains up to 10 diskettes) or from three individual slots.
- Each magazine can store up to 12 MB of data.
- Up to 24 MB of data can be read or written without operator intervention.



### IBM 5252 Display Station

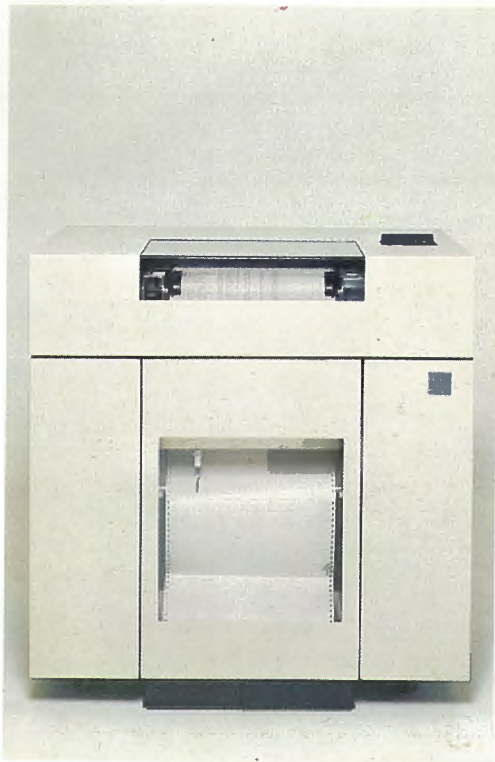
- Dual screen with up to 960 characters.
- Provides all the same facilities and power as the 5251 Display Station.
- Shared components greatly enhance economy.

### IBM 5251 Display Station

- Single screen with up to 1920 or 960 characters.
- Large, dense, easy-to-read characters.
- Upper and lower case.
- Ability to highlight significant data in a variety of ways under program control.
- Familiar typewriter keyboard with separate keypad.
- Can be used locally (up to 5000 cable feet from the System Unit) or remotely via Post Office\* dial-up or leased lines.

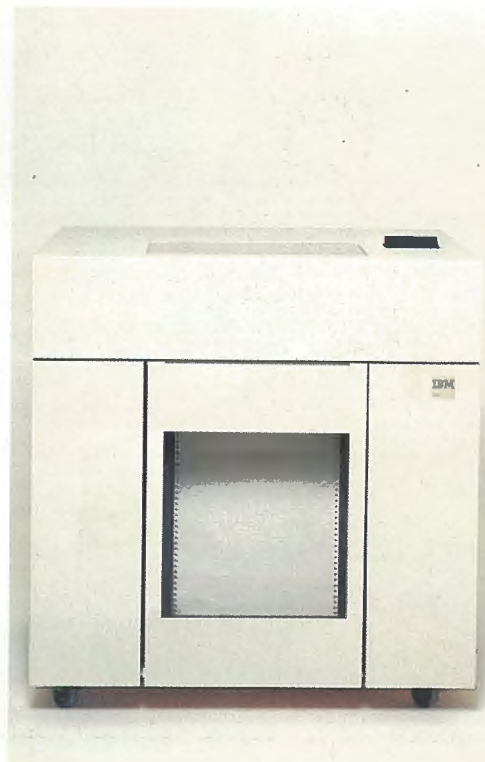
\*Subject to your making all necessary arrangements with the Post Office.





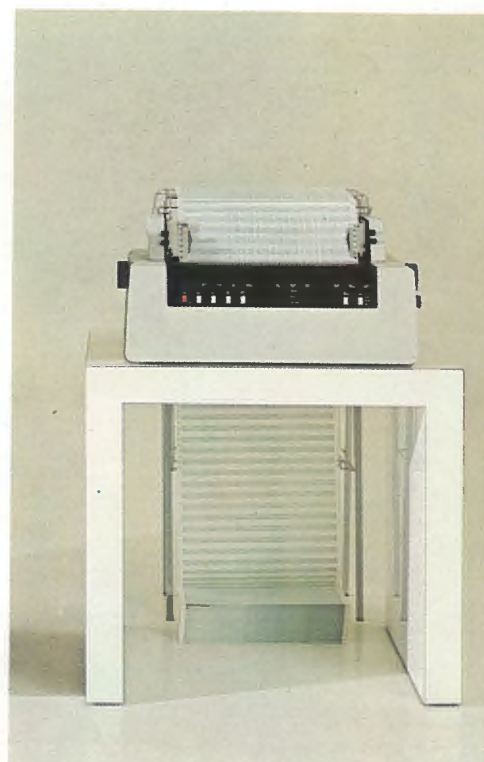
**IBM 5211 Printer Model 2**

- Standalone line printer, cable connected with own power supply.
- Print speed of up to 300 lines per minute with 48 character set.



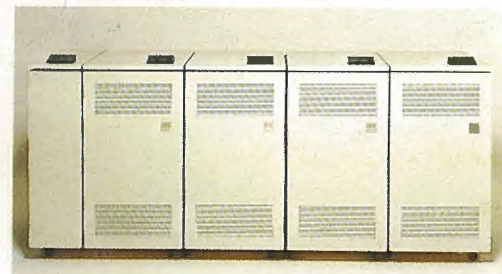
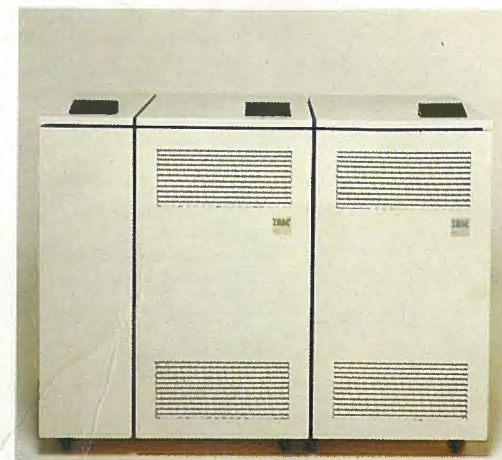
**IBM 3262 Printer Models A1 and A2**

- Model A1 – directly attached to 5381 ; Model A2 – standalone unit.
- Print speed of up to 650 lines per minute with 48 character set.



**IBM 5256 Printer**

- Print speeds of up to 40, 80 or 120 characters per second.
- Bi-directional printing.
- Upper and lower case.



**IBM 3370 Direct Access Storage Device**

- Non-removable, large-capacity disk storage – available as an alternative or in addition to the 64.5 MB drives.
- Model A11 contains the control unit and up to 1140 MB.
- Model B11 provides for up to three additional drives which, when attached to Model A11, offers a total capacity of up to 2280 MB.

# System/38 Technical Summary

## Equipment

### IBM 5381 System Unit

- Main storage cycle time (4-byte data path):
  - Models 3XXX: 1100 nanoseconds
  - Models 5XXX: 600 nanoseconds.
- Main storage capacities:
  - 512K bytes
  - 768K bytes
  - 1024K bytes
  - 1280K bytes
  - 1536K bytes
  - 1792K bytes
  - 2048K bytes.
- Control storage 8K words.
- Workstation controller permits attachment of up to 40 local workstations.
- Communications adapter controls up to four communications lines operating at up to 9600 bits per second. Can support up to 256 remote workstations.
- Up to six non-removable disk storage drives, each up to 64.5 MB capacity. Data transfer rate up to 1.03 MB per second; average access time 23.5 milliseconds.
- Up to four large-capacity, non-removable disk storage drives, each up to 570 MB capacity. Data transfer rate up to 1.86 MB per second with a maximum average access time of 20 milliseconds.
- Diskette drive – read/write capability for up to two 12 MB diskette magazines and three individual diskettes. Data transfer rate one million bits per second.
- Diskette types 1, 2 and 2D supported.

### IBM 5251/5252 Display Stations

- Local or remote.
- Single display (5251) – 960 or 1920 characters.
- Dual display (5252) – 960 characters.
- Typewriter keyboard with ten-key numeric pad.
- Upper and lower case 96 character set.
- Multiple displays and matrix printers can be attached to System/38 locally or remotely.

### Line Printers

- IBM 5211 Printer Model 2: print speed of up to 300 lines per minute with 48 character set.
- IBM 3262 Printer: print speed of up to 650 lines per minute with 48 character set.
- Both printers offer:
  - Six or eight lines per inch vertical spacing

- 132 character print positions
- Automatic spacing under program control
- Wide variety of upper and lower case print belts
- Specialised belts for optimised printing speeds.
- Up to two line printers can be connected to the 5381.

### IBM 5256 Printer

- Matrix printer with speeds of up to 40, 80, or 120 characters per second.
- Six or eight lines per inch vertical spacing.
- 132 print positions.
- Bi-directional, look-ahead operation.
- Upper and lower case 96 character set.
- Multiple printers can be attached to System/38 locally or remotely.
- Every printer whether local or remote can have separate spool queues.

### IBM 5424 Multi Function Card Unit

- 96 column cards
- Operating speeds (cards per minute) up to:

	Model A1	Model A2
Read	250	500
Punch	60	120
Print	60	120

### IBM 3410/3411 Magnetic Tape Subsystem

- One 3411 Magnetic Tape Unit and Controller plus up to three 3410 Magnetic Tape Units can be attached.
- Three models provide a data transfer rate of up to 20 KB, 40 KB or 80 KB per second. 1600 (phase encoded) or 800 (NRZI) bits per inch are supported for 9-track tapes only.

### Communications

- Synchronous Data Link Control (SDLC) communications and software support for the following:
  - IBM 525X point-to-point and multidropped
  - System/370 and 303X processors as hosts in a Systems Network Architecture (SNA) environment. (System/38 will appear as a level LU1 within the SNA network.)
- Line speeds of 600 to 4800 bits per second (switched lines) and 600 to 9600 bits per second (non-switched lines).
- Parameters for general transmission characteristics defined external to application programs.

## IBM Licensed Programs

### System/38 Application Language

- RPG III – an extension of RPG II to support advanced workstation programming. Based upon, and upward compatible with, System/3, System/32 and System/34 RPG II.

### System/38 Application Programs

- Order Entry and Invoicing.
- Sales Ledger.
- Sales Analysis.
- Inventory Management.
- Materials Requirements Planning.
- Product Data Management.
- Production Control and Costing.
- Data Collection System Support.
- Forecasting.
- Purchasing Analysis.

### System/38 Utilities Support

- Interactive source statement entry for programs and data definition specifications.
- Interactive data entry.
- Interactive report writing.
- Interactive inquiry.
- Data re-formatting.
- System/3 conversion – batch and CCP.

### Control Program Facility (CPF)

Control Program Facility (CPF) provides consistent user interface to System/38 machine product facilities:

- Single level storage virtual management system.
- Data base facilities.
- RPG III
- Machine-controlled security system.
- Test mode facilities.
- Command Language.

### Equipment and licensed programs for IBM System/38 are available and chargeable under separate agreements.

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The photographs in this brochure are of engineering and design models; display screens are simulated computer displays, intended to serve only as examples. Any names of individuals, companies, brands, and non-IBM products are fictitious, and similarities to actual names are coincidental.

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