TIME-SHARING SYSTEM SCORECARD

A SURVEY OF ON-LINE MULTIPLE USER COMPUTER SYSTEMS

This guide has been prepared to keep the reader abreast of the rapidly increasing number of time-shared computer systems which are bringing man and machine together in close partnership for the pursuit of intellectual and administrative activities. By glancing at the chart on the next page the reader can judge for himself the progress which is being made in this new and dynamic field. There are several different definitions of time-sharing. No single definition is adequate for all purposes. We have limited this survey to systems which have at least two independent, remote and simultaneously operable consoles (from the user's point of view). If the language capabilities of the system are extensive and general so that a user can create new languages while working on-line, we have denoted this as a general purpose time-sharing system in the chart. Where the language capabilities are more restrictive, permitting the user to work in only one specific problem area, we have used the term special purpose time-sharing system. This distinction should be used with care, however, for the boundary is not too precise. Although response times are a very important characteristic of all time-sharing systems, they have not been listed in this survey because they have widely differing meanings and are difficult to compare.

In addition to the unique systems described in the chart we have also listed some of the packaged time-sharing systems which computer manufacturers are offering to their customers. As time goes on it is expected that more manufacturers will provide a time-sharing capability with their computers. Finally, we have listed a few restricted multiple user systems for reservations and stock market quotations as a further example of the impact that on-line technology is having on modern information processing.

CHARACTERISTICS LISTED IN CHART

STATUS — O-operational system, number in parenthesis denotes the approximate date that the system went on the air. D-system under development with anticipated date that operations will begin.

TYPE — G-general purpose, S-special purpose.

COMPUTER — manufacturer's name and number of central computers in system.

C/M/U/N — denotes whether commercial, military, university or non-profit organization operates system. PR-denotes system for private or internal use only, PU-system available for general public use, SP-semi-public use permitted.

LANGUAGES — basic languages available on system at present.

TERMINALS — type of terminal equipment available, number of such terminals in parenthesis. Code: TT followed by number denotes TELETYPE terminals and model number, TY-typewriter, TLX-Telex console, CRT-cathode ray tube display, BR-Bunker Ramo series 200 display consoles, IBM 1050-keyboard consoles.

MAIN STORAGE — first number denotes total core storage on system, second number in parenthesis, if given, denotes maximum core storage available to an individual user.

SECONDARY STORAGE — DR-magnetic drum, DK-disk file, MT-magnetic tape (K = 1000, M = 1,000,000).

NO. OF USERS — maximum number of users who can operate simultaneously at any given time.

PACKAGED TIME-SHARING SYSTEMS

Several computer manufacturers have announced their intention to provide customers with a packaged time-sharing capability along with delivery of their computers. The Digital Equipment Corporation will provide a time-sharing system with its PDP-6 computer. IBM announces that it will make a time-sharing monitor available with its System 360, models 67 and 75. A time-sharing system may be offered with the General Electric 635 computer. It is also reported that IBM will market a QUICKTRAN package to owners of 7040 series computers.

RESTRICTED MULTIPLE USER SYSTEMS

There are several computer-based systems which permit many users to carry out a limited number of pre-programmed functions simultaneously. Some of these systems are listed below.

Reservations Systems:

SABRE SYSTEM — American Airline's Reservation System

RESERVATRON — Sheraton Hotel Reservation System

Stock Market Quotation Services:

AMQUOTE — Teleregister Division of Bunker Ramo Corporation

QUOTRON — Scantlin Electronics Inc.

STOCKMASTER — Ultronics Systems Corp.

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ORGANIZATION	STATUS	TYPE	COMPUTER(S)	C/M/U/N	LANGUAGE(S)	TERMINALS	MAIN STORAGE	SECONDARY STORAGE	NO. OF USERS	REMARKS
Adams Associates — Keydata System Cambridge, Mass.	O (5/65)	G	PDP-6	C-PU	Fortran KOP-III	TT-28 (16)	48K (32K)	DR (1M Wds.) DK (11M Wds.) MT (2 Units)	16 [1]	For on-line invoice preparation and inventory control, other accounting uses under development
Aviation Supply Office [2] Philadelphia, Pennsylvania	O (10/62)	S	IBM-1410	M-PR		IBM-1014 (12)		DK (2 Units)	2	Inventory control system
Bell Telephone Laboratories [3] Murray Hill, New Jersey	D (2/66)	G	GE-636 [4]	C-PR	Information not available					
Bolt Beranek and Newman Inc. [5] Cambridge, Mass.	O (6/64)	G	PDP-1D [6]	C-SP	MIDAS TOLL-1 [7]	TT-33 (48)	24K (4K)	DR (128K Wds.) DR (25M Wds.) MT (2 Units)	32	Medical Information and communications system for hospitals
Carnegie Institute of Technology Pittsburgh, Penn.	O (3/65)	S	2 G-20	U-PR	ALGOL	TT-33 (12)		DR	12	
Dartmouth College [8] Hanover, N. H.	O (9/64)	G	GE 235 DATANET-30	U-PR	BASIC ALGOL	TT-35 (22)	(6K)	DK MT	8	Educational time-sharing system
IBM QUICKTRAN Service New York, New York	O (5/65)	S	IBM-7040 7044	C-PU	QUICKTRAN [9]	IBM 1050 (40)	32K	DK MT	40	On-line scientific computation service
MIT Computation Center Cambridge, Mass.	O (9/63)	G	IBM-7094	U-SP	Same as Project MAC Phase one		64K (32K)	DK DM MT	Same as Project MAC Phase one	
MIT Dept. of Electrical Eng. Cambridge, Mass.	O (9/63)	G	PDP-1	U-PR	MIDAS	TY (3)	4K	DR	3	Experimental time-sharing system for student use
Naval Command System [10] Support Activity	O (12/64)	S	2 CDC-1604 2 CDC-160A	M-PR		TT-33 (8)	32K	DK (2 units)	8	For tracking, control and scheduling naval vessels
Project MAC — MIT (Phase One) Cambridge, Mass.	O (9/63) [11]	G	IBM-7094	U-SP	ALGOL [12] FORTRAN MAD LISP	TT-35 (54) IBM-1050 (56) TLX (1)	64K (32K)	DR (36M Wds.) DM MT	30	Project MAC is an MIT research program sponsored by the Advanced Research Projects Agency, D.O.D., under the Office of Naval Research
Project MAC — MIT (Phase Two) Cambridge, Mass.	D (2/66)	G	GE-636 [4]	U-SP		500 [13]	128K	DK DM	150 [13]	
RAND Corporation Santa Monica, California	O (2/64)	S	Johnniac	N-PR	JOSS	TY (8)	4K Wds.	DR (12K Wds.)	8	
Space Technology Laboratory El Segundo, California (Culler-Fried System)	O (1/65)	S	Bunker-Ramo 340	C-SP	MATHE-MATICAL ANALYSIS	4 Consoles [14]	8K	DR (48K Wds.) MT	4	Highly flexible system for on-line manipulation, specification and execution of mathematical operations with graphical display of results
Stanford University Stanford, California	O (6/64)	G	IBM-7090 [15] PDP-1	U-SP	MACRO [16] LISP FORTRAN	PHILCO (12) TT (8)	20K	DK DR	20	
System Development Corp. Santa Monica, California	O (6/64)	G	AN/FSQ-32 [15] PDP-1	N-SP	TINT IPL-TS JOVIAL	TT-28 (8) TT-33 (16) TY (3) CRT (6)	80K (48K)	DR (400K Wds.) DR (4M Wds.) MT (16 Units)	30	Oriented to command and control experimentation
U.C.L.A. Western Data Processing Center Los Angeles, California	O (11/64)	S	IBM-7740 [17] IBM-7040/ 7094	U-SP		IBM-1050 (12)	32K	DK DM	12	Jointly financed by UCLA and IBM, system services UCLA and 88 other California schools
University of California Berkeley, California	D ( )	G	SDS-930	U-PR	FORTRAN	TT-33 (6) CRT	32K	DR	6	
University of California Santa Barbara, California (Culler-Fried System)	O (3/65)	S	RW 400 AN/FSQ-27	U-PR	MATHE-MATICAL ANALYSIS	16 Consoles [14, 18]	6K	DR (80K Wds.) DR (500K Wds.)	16	Highly flexible system for on-line manipulation, specification and execution of mathematical operations with graphical display of results
University of Pennsylvania Philadelphia, Penn.	D (6/65)	G	IBM-7040 PDP-5	U-SP	MULTI-LANG MAP ALGOL	TT-35 (4) BR (2)	32K (24K)	DK	6	

NOTES

1. System to be expanded to 48 users shortly.
2. Developed under contract with the Moore School of Electrical Engineering, University of Pennsylvania.
3. Development in cooperation with Project MAC, Massachusetts Institute of Technology.
4. Multiple Processor Time-sharing system.
5. Developed with the Massachusetts General Hospital under contract from the National Institutes of Health.

6. Based upon an earlier 5 station PDP-1 system operational 9/63.
7. Version of the RAND JOSS language.
8. Developed with the cooperation of the General Electric Co.
9. On-line version of FORTRAN.
10. Developed under contract with Computer Command Control Corp.
11. Initially time-shared in 1962 at the M.I.T. Computation Center.
12. Other languages include FAP, SLIP, COGO, SNOBOL, STRESS and OPL-1.
13. This system is eventually expected to handle 500 terminals and 150 simultaneous users some time after initial operation begins.

14. Each console consists of two keyboards and a storage tube display. A camera and plotter are shared among the consoles.
15. Example of main computer with satellite computer for communication with consoles and scheduling.
16. Other languages include FAP, GOGOL and BALGOL.
17. System currently utilizes five computers in addition to central 7740.
18. Other terminal equipment to be installed include a RAND tablet and a Grafacon.