MANUFACTURER'S TIME-SHARING SYSTEMS

The following manufacturers offer interactive time-sharing software with the models indicated.

MANUFACTURER	MODEL	WORD SIZE (Bits)	ADD TIME IN μ-SEC.	ON-LINE LANGUAGES	FIRST DELIVERY
Control Data Corp.	3300/3500	24	2.5/1.6	FORTRAN COBOL	6/66
Digital Equipment Corp.	PDP-6	36	4.4	MACRO-6 FORTRAN	10/64
General Electric Co.	235	20	12	BASIC ALGOL	6/65
General Electric Co.	645	36	1.8		3/66
International Business Machines	System/360 Model 67	32	1.3	PL/I FORTRAN	9/67
Scientific Data Systems	940	24	3.5	FORTRAN CAL, LISP SNOBOL	4/66

COMMERCIAL TIME-SHARING SYSTEMS

Users can purchase remote, on-line and interactive computer services from the organizations listed below.

ORGANIZATION	COMPUTER	LANGUAGES	TERMINALS	NO. OF USERS	COST/HR.*
Charles W. Adams Assoc. Keydata System Cambridge, Mass.	UNIVAC 491	KOP-III	TT-28	16	Dependent on[15] User Program
Applied Logic Corp. Tele-Computing Service Princeton, New Jersey	DEC PDP-6	FORTRAN IV[16] MACRO-6	TT-33 CRT	20	$5.00 plus $360/Hr. for Processor Time
Bolt, Beranek and Newman Inc. TELCOMP Service Cambridge, Mass.	DEC PDP-1	TELCOMP	TT-33	16	$12.50
CEIR Inc. Arlington, Virginia	GE 235 DATANET-30	BASIC	TT-33	30	$5.00
General Electric Co.[17] New York, N. Y.	GE 235 DATANET-30	BASIC[18] ALGOL	TT-33	30	$12.00[19]
International Business Machines QUIKTRAN Service New York, N. Y.	IBM 7044	QUIKTRAN	IBM 1050	40	$12.00

* Calculated on the basis of 50 hours usage per month.

15. For accounting and management information uses. Charges on basis of message transmissions, processor time and storage used.
16. Other on-line languages under development.
17. Additional systems to be located in Phoenix, Washington, D.C., and Schenectady.
18. FORTRAN to be available in February, 1966.
19. Processor time charged at $180/hr after first 2 hrs.

COMPUTER RESEARCH CORPORATION
774 Pleasant Street
Belmont, Massachusetts 02178
Tel. (617) 484-9686

COMPUTER RESEARCH CORPORATION

TIME-SHARING SYSTEM SCORECARD

A SURVEY OF ON-LINE MULTIPLE USER COMPUTER SYSTEMS

Fall, 1965 **No. 2**

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 following three charts 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. 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.

In the past six months, a number of manufacturers have announced new computer systems which are designed specifically to accommodate time-sharing use. These have been tabulated in a separate chart for the reader's convenience. In a third chart, we have listed six commercial time-sharing service bureaus that are now in operation. These are the first of many organizations that are expected to enter this new industry within the next several months. While some of these will operate on a local basis, such as the Tymshare Corp. which plans to service San Francisco, and Allen-Babcock Computing which plans to service Los Angeles with an IBM Model 50, the larger companies have more ambitious goals. Western Union has plans for a national communications network linking a series of time-shared computers. Although message switching will be the first application, WU intends to use the system for other types of information processing. By 1970, they estimate that 40,000 subscribers will have access to their information utility.

CHARACTERISTICS LISTED IN CHARTS

STATUS O-operational system, number in parentheses 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.

LANGUAGES basic languages available on system at present.

TERMINALS type of terminal equipment available, number of such terminals in parentheses. 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, PHILCO-display consoles.

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

SECONDARY STORAGE DR-magnetic drum, DK-disk file, MT-magnetic tape (K = 1024, M = 1,000,000).

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

The information reported in this survey is believed to be accurate and is published as a public service. Many of the systems described are still being modified and consequently their characteristics may change from time to time. Computer Research Corporation cannot be held responsible for any errors or omissions. Readers desiring more detailed information about a particular system should write directly to the organization listed. This survey may not be reproduced for any purpose without the written consent of Computer Research Corporation. This material will be updated periodically to include new systems as they are developed and to correct any errors, omissions or changes which are brought to our attention. Copies of the updated survey will be sent upon request.

RESEARCH ORIENTED TIME-SHARING SYSTEMS

Prepared by COMPUTER RESEARCH CORPORATION

ORGANIZATION	STATUS	TYPE	COMPUTER(S)	LANGUAGE(S)	TERMINALS	MAIN STORAGE	SECONDARY STORAGE	NO. OF USERS	REMARKS
Bell Telephone Laboratories [1] **Murray Hill, New Jersey**	D (12/66)	G	GE-645 [2]	FORTRAN IV COBOL, PL/I SNOBOL	TT-37 IBM 1050 CRT (10)	256K	DK (40M Wds.) DR (4M Wds.) Tape Loop (100M Wds.)	100	Highly interactive system for research and production computing
Bolt, Beranek and Newman Inc. [3] **Cambridge, Mass.**	O (6/64)	G	PDP-1D [4]	MIDAS TELCOMP [5]	TT-33 (48)	24K (4K)	DR (128K Wds.) DR (25M Wds.) MT (2 Units)	48	Medical Information and communications system for hospitals
Carnegie Institute of Technology Pittsburgh, Penn.	O (3/65)	G	2 G-20	ALGOL	TT-33 (12)		DR	12	
Dartmouth College [6] **Hanover, N. H.**	O (5/64)	G	GE 235 DATANET-30	BASIC ALGOL	TT-35 (37)	32K (6K)	DK (6M Wds.) MT (8 Units)	27	Educational time-sharing system
MIT Computation Center Cambridge, Mass.	O (11/61)	G	IBM-7094	Same as Project MAC Phase one		64K (32K)	DK DR MT	24	
MIT Computation Center Cambridge, Mass.	D (1/67)	G	IBM 360 [2] 2 Model 67			256K	DK (52M Wds.)	200	
MIT Dept. of Civil Eng. ICES SYSTEM Cambridge, Mass.	D (12/66)	S	IBM 360 Model 40	ICETRAN STRESS COGO	IBM 2741 (5) IBM 2250	32K	3 DK (1.8M Wds.)		Integrated system for civil engineering problems
MIT Dept. of Electrical Eng. Cambridge, Mass.	O (5/63)	G	PDP-1	Macro Assembler	TY (4)	12K	DR (88K Wds.)	4	Experimental time-sharing system for student use in thesis and research projects
Ohio State University Columbus, Ohio	D (9/66)	G	GE-645 [2]		TT (15) CRT (8)	64K	DK	23	
Perkin Elmer Corp. Norwalk, Conn.	D (12/65)	G	SDS-9300 SDS-930	FORTRAN IV	TT, TY TWX	32K		16	
Project MAC — MIT (Phase One) Cambridge, Mass.	O (10/63) [7]	G	IBM-7094	ALGOL [8] FORTRAN MAD LISP	TT-35 (54) IBM-1050 (56) TLX (1) TWX PRIME (3) CRT (2)	64K (32K)	DK (36M Wds.) DR (.5M Wds.) MT (12 Units)	30	Project MAC is an MIT research program sponsored by the Advanced Research Projects Agency, D.O.D., under a contract with the Office of Naval Research
Project MAC — MIT (Phase Two) Cambridge, Mass.	D (9/66)	G	GE-645 [2]		TT-37 [9]	128K	DK DR (4M Wds.) MT (8 Units)	150 [9]	Expected to be capable of limited demonstration in Fall, 1966 and in normal operation by January 1967
RAND Corporation Santa Monica, California	O (5/63)	S	Johnniac [10]	JOSS	TY (10)	4K	DR (12K Wds.)	8	Interpretive system with compact conversational language for small numerical problems
Rensselaer Polytechnic Institute Troy, N. Y.	D (8/66)	G	IBM 360 Model 50	FORTRAN	TT-33(16)	64K	3DK (1.8M Wds.) MT (4 Units) Core (256K Wds.)	16	For education, language development and control of laboratory experiments
TRW Systems Group Redondo Beach, California	O (1/65)	S	Bunker-Ramo 340	Culler-Fried System for Mathematical Analysis	4 Consoles [11]	16K	DR (48K Wds.) MT	4	Highly flexible system for on-line manipulation, specification and execution of mathematical and symbolic operations with graphical display of results
Stanford University Stanford, California	O (6/64)	G	IBM-7090 PDP-1	MACRO [12] LISP FORTRAN	PHILCO (12) TT (8)	20K	DK DR	20	
System Development Corp. Santa Monica, California	O (1/64)	G	AN/FSQ-32 [13] PDP-1	TINT IPL-TS JOVIAL LISP	TT-28 (6) TT-33 (22) TY (3) CRT (6)	68K (48K) 16K Buffer	3 DR (136K Wds.) DK (4M Wds.) MT (16 Units)	30	Oriented to command and control experimentation and other general uses
U.C.L.A. Western Data Pocessing Center Los Angeles, California	O (11/64)	S	IBM-7740 [14] IBM-7040/ 7094		IBM-1050 (12)	32K	DK DR	12	Jointly financed by UCLA and IBM, system services UCLA and 88 other California schools
University of California Berkeley, California	D (12/65)	G	SDS-930 PDP-5	FORTRAN ALGOL, LISP SNOBOL	TT-33 (6) CRT, RAND TABLET	32K (16K)	DR (1.3M Wds.)	6	
University of California Santa Barbara, California	O (3/65)	S	RW 400 AN/FSQ-27	Culler-Fried System for Mathematical Analysis	16 Consoles [11] RAND TABLET	6K	DR (80K Wds.) DR (500K Wds.)	16	Highly flexible system for on-line manipulation, specification and execution of mathematical and symbolic operations with graphical display of results
University of Pennsylvania Philadelphia, Penn.	D (6/65)	G	IBM-7040 PDP-5	MULTI-LANG MAP, ALGOL	TT-35 (4) BR (2)	32K (24K)	DK	6	

NOTES

1. Development in cooperation with Project MAC, Massachusetts Institute of Technology.
2. Multiple processor time-sharing system.
3. Developed with the Massachusetts General Hospital under contract from the National Institutes of Health.
4. Based upon an earlier 5-station PDP-1 system operational 9/62.
5. Version of the RAND JOSS language.
6. Developed with the cooperation of the General Electric Co.
7. Initially time-shared in 1961 at the M.I.T. Computation Center.
8. Other languages include FAP, SLIP, COGO, SNOBOL, STRESS, GPSS, COMIT and OPL-1.
9. In addition will use same terminals as MAC Phase One.
10. JOSS II is being implemented on a DEC PDP-6.
11. Each console consists of two keyboards and a storage tube display. A camera and plotter are shared among the consoles.
12. Other languages include FAP, GOGOL, and BALGOL.
13. To be replaced by an IBM 360 Model 67 in early 1967.
14. System currently utilizes five computers in addition to central 7740.