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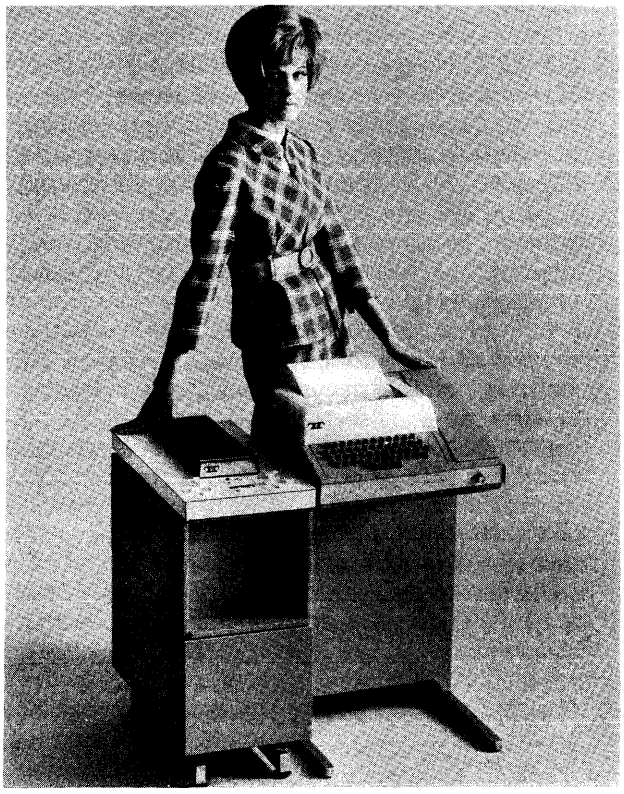
All About Remote Computing Services

Remote computing service companies owe their existence and rapid growth to the generally accepted principles that:

- Because of the inherent economics of computer production and operation, it's usually chapter to use a small piece of a large computer system than a large piece (or all) of a small one.
- Computers should be easy to use and should maximize the efficiency of the *people* who use them.
- Thousands of prospective users want and need a convenient, economical source of computer power.
- Present equipment, software, and communications technology makes it practical to divide the resources of a large computer system among many simultaneous users at remote terminals.

The currently available remote computing services can be broadly classified as either interactive time-sharing or remote batch processing services. Many companies now offer both types of services, and the distinctions between them are frequently blurred.



The economical Teletype Model 33 terminals (shown here with Teletype's cartridge-loaded Magnetic Tape Data Terminal) are still by far the most widely used terminals for time-sharing applications.

Remote computing companies are supplying a broad range of services to thousands of business firms of all sizes. This report explains interactive time-sharing and remote batch processing, describes their advantages and drawbacks, summarizes the current offerings of 97 remote computing companies, reports users' ratings of 30 of the leading companies, and provides straightforward guidelines for selecting the company that best meets your needs.

An *interactive time-sharing system* can be defined as a computer system that enables multiple users to gain simultaneous access to its facilities and to interact with the system in a conversational mode. A *remote batch processing system* can be defined as a system that enables users at remote locations to enter data, initiate the batch-mode execution of programs, and receive the resulting output data. Ideally, either type of system should give each user the impression that all the computational, storage, input/output, and software resources he needs are continuously at his disposal, while keeping him unaware of the fact that he is actually competing with many other customers for the use of these resources.

Though the remote computing concept is quite simple, its effective implementation turned out to be a difficult task for both equipment and software designers.

The first time-sharing systems were developed in the universities in the early 1960's, with M.I.T. and Dartmouth in the vanguard. The first commercial time-sharing services were established in 1965. Both the suppliers and the users of these early services had to overcome many problems, and progress was quite slow at first. But by 1968, time-sharing had become the hottest topic in the computer industry and the darling of Wall Street, and it seemed as if everybody was trying to get into the act.

Unfortunately, the economic crunch that began in 1969, coupled with the sadly misdirected technical and sales efforts of many of the young time-sharing firms, led to a severe shakeout. New customers were hard to find, and it became virtually impossible to raise capital to start a new remote computing company or nurture an existing one. Dozens of remote computing service firms merged with other companies, abandoned their remote computing efforts in favor of more promising activities, or closed their doors completely.

Fourth, the 10-character-per-second Teletypewriter input/output speeds of the early commercial time-sharing services made them unsuitable for any data processing function that involved large volumes of input and/or output data. In order to qualify for a broader range of business applications, many of the remote computing companies are now offering both faster typewriter-style terminals, with speeds in the 30-character-per-second range, and high-speed batch-mode terminals capable of reading cards and printing reports at 120 to 600 characters per second.

Thus, definite progress is being made toward overcoming the main obstacles against widespread use of commercial remote computing systems for business applications. Three other recent trends seem destined to help accelerate the swing toward remote computing for business data processing:

- The establishment of dedicated systems designed to satisfy the data processing requirements of specific types of businesses.

- The development of nationwide networks that enable users in many different locations to access a central data base. (The most impressive current examples are GE's international network, which is available by local telephone in over 300 cities in the U.S. and Canada and over 25 cities in Western Europe, and Tymshare's TYMNET, which uses more than 60 special communications processors and over 40,000 miles of leased Bell System lines.)

- The availability of a wide range of application programs from sources other than the remote computing companies themselves. A promising concept called "piggy-backing" involves the development of application programs by independent software firms and the marketing of these programs for operation on specific remote computing systems.

THE FUTURE OF REMOTE COMPUTING

The advantages of remote access to large computer systems are so obvious and attractive that the number of users and applications are bound to increase dramatically in the years to come.

On the basis of current trends and projections, it seems likely that the remote computing industry of the future will shape up this way:

- There will be several large, nationwide suppliers of remote computing services. These will be true "information utilities," offering a broad range of computational, information retrieval, and communications services to users throughout the country (and perhaps the world).

- The smaller remote computing companies that survive will generally do so by offering highly specialized services to specific types of business firms. Companies attempting to market plain "computing power" will find it increasingly difficult to stay alive.

- Many current users of commercial remote computing services will install their own in-house computer systems. Some companies will install small computers (such as the IBM System/3 or the proliferating minicomputers) to replace individual time-sharing or remote batch terminals, while others will install full-barreled in-house time-sharing systems of their own. To make up for these lost customers and maintain their growth, the remote computing suppliers will have to keep on attracting new customers, primarily from the huge ranks of small business firms.

- Remote computing users will have an ever-growing variety of "packaged" application programs to choose from. These will be developed by both the remote computing companies and independent software firms. "Piggy-backing" of specialized services on existing remote computing networks will continue to increase.

- Finally, both suppliers and users will begin to take advantage of the fact that the nationwide remote computing networks can be used effectively for a broad range of communications functions, as well as for computation and information retrieval. The same remote computing system that satisfies a company's computational needs and holds its data files will also be able to handle its message transmission, data collection, report distribution, and other communications requirements.

When the remote computing companies offer this broad spectrum of services, and when a large number of business firms accept and use them on a daily basis, the age of the "information utility" will have arrived at long last. At the present time, however, remote computing users have to settle for much less. The guidelines and comparison charts that follow will help prospective users to assess what's available today and how it can aid in solving their information processing problems.

USER EXPERIENCE

To access the current level of user satisfaction with specific remote computing companies and with remote computing techniques in general, Datapro Research Corporation conducted an extensive user survey. A Reader Survey Form on Computer Time-Sharing Services was included in the September 1973 supplement to DATAPRO 70 and mailed to all subscribers. By November 1, usable responses had been received from 141 users of commercial remote computing services in the United

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States and Canada. Some users reported their experiences with as many as 4 different remote computing companies, and the average number of companies mentioned was 1.75. Thus, it is apparent that many organizations are finding it advantageous to use the services of two or more suppliers concurrently.

It should be noted that the 141 DATAPRO 70 subscribers who responded to our survey do not necessarily constitute a representative sample of "typical" remote computing users. Furthermore, the small sample sizes for many of the services make it unwise to draw firm conclusions from the indicated ratings. If the reader will keep these caveats in mind, we believe the survey results that follow can be of considerable value to users and prospective users of the commercial remote computing services.

The responding users were asked to rate each remote computing service they were using by assigning a rating of Excellent, Good, Fair, or Poor to its overall effectiveness, reliability, response time, languages and compilers, application programs, technical support, and economy. The individual user ratings earned by 30 remote computing companies are summarized in the accompanying table.

A "Weighted Average of All Ratings" was calculated for each company by assigning a value of 4 to each user rating of Excellent, 3 to Good, 2 to Fair, and 1 to Poor. Among the 13 companies rated by 5 or more users, those that earned the highest average ratings were: International Timesharing Corporation (rated 3.20 by 7 users), Cyphernetics Corporation (rated 3.17 by 7 users), Computer Sciences Corporation (rated 3.15 by 7 users), Rapidata, Inc. (rated 3.12 by 6 users), On-Line Systems, Inc. (rated 3.03 by 5 users), and The Service Bureau Corporation (now a Control Data subsidiary; rated 3.01 by 28 users). Highly regarded companies mentioned by fewer than five users included Scientific Time Sharing Corporation (rated 3.50 by 2 users) and Metridata Computing, Inc. (rated 3.19 by 3 users).

The ratings assigned by all of the responding users can be combined to form the following overall picture of user satisfaction with the current remote computing services:

	Excellent	Good	Fair	Poor
Overall effectiveness	30%	57%	11%	2%
Reliability	32%	51%	13%	4%
Response time	27%	50%	18%	5%
Languages and compilers	28%	57%	13%	2%
Application programs	22%	48%	24%	6%
Technical support	23%	40%	26%	11%
Economy	16%	45%	31%	8%

These figures make it clear that users are quite pleased with the overall effectiveness of the current remote computing services, and also with their reliability and with the languages and compilers they offer. On the other hand, there is still ample room for improvement in the areas of technical support, economy, application programs, and response time.

The communications terminals used by the survey respondents were as follows:

Terminal	No. of Users	% of Total
Teletype Model 33	53	38
GE TermiNet 300	32	23
UNIVAC DCT 500	21	15
Teletype (model not specified)	15	11
IBM 2741	14	10
Texas Instruments Silent 700 Series	12	9
Hazeltine 2000	10	7
Anderson-Jacobson (all models)	9	6
CTS Execuport	6	4
Memorex 1200 Series	6	4
Teletype Model 35	6	4
Computer Devices (all models)	5	4
Novar (now GTE; all models)	5	4
ITT Asciscope	4	3
NCR 260	3	2
Teletype Model 38	3	2
Other interactive terminals	31	22
Remote batch terminals (all makes and models)	14	10

The number of different types of terminals used by individual respondents ranged from 1 to 7 and averaged 1.74.

The programming languages used by the survey respondents were as follows:

	No. of Users	% of Total
BASIC	102	72
FORTRAN	92	65
COBOL	29	21
PL/1	14	10
Assembly (all types)	7	5
APL	4	3
ALGOL	2	1
None*	4	3
All other languages	14	10

* Apparently these users relied completely on "packaged" application programs.

The number of different programming languages used by individual respondents ranged from 1 to 5 and averaged 1.90.

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USERS' RATINGS OF REMOTE COMPUTING SERVICES

Company*	No. of User Replies	Weighted Average of All Ratings**	Users' Ratings**																									
			Overall Effectiveness				Reliability				Response Time				Languages and Compilers				Application Programs				Technical Support				Economy			
			E	G	F	P	E	G	F	P	E	G	F	P	E	G	F	P	E	G	F	P	E	G	F	P	E	G	F	P
ACTS Computing Corp.	2	2.93	0	2	0	0	0	1	1	0	0	1	1	0	0	2	0	0	0	2	0	0	0	2	0	0	1	1	0	0
Allen-Babcock Computing	3	2.33	1	0	1	1	0	1	1	1	1	0	0	2	0	3	0	0	0	0	2	1	0	1	2	0	1	1	1	0
Compu-Serv	2	3.07	1	1	0	0	0	1	1	0	1	1	0	0	1	1	0	0	0	1	0	1	0	1	1	0	2	0	0	0
Computel Systems Ltd.	2	2.92	0	1	1	0	1	0	1	0	1	0	1	0	1	1	0	0	0	1	0	0	1	0	0	1	0	2	0	0
Computer Sciences Canada	3	2.48	0	2	1	0	0	2	1	0	0	1	2	0	0	0	3	0	0	2	1	0	0	2	1	0	0	1	2	0
Computer Sciences Corp.	7	3.15	3	3	1	0	2	4	1	0	4	3	0	0	5	1	1	0	1	5	0	0	1	4	1	1	0	4	3	0
Com-Share, Inc.	4	2.68	0	4	0	0	1	2	1	0	0	1	2	1	2	2	0	0	0	2	2	0	0	2	1	1	0	2	2	0
Control Data Corp.	6	2.62	2	4	0	0	0	3	1	2	1	3	2	0	0	4	1	1	2	1	2	1	0	2	2	2	1	3	2	0
Cyphernetics Corp.	7	3.17	2	5	0	0	2	5	0	0	1	5	1	0	2	5	0	0	2	4	1	0	1	4	1	0	1	5	0	0
Dataline Systems Ltd.	3	3.05	2	1	0	0	0	2	1	0	1	1	0	1	1	2	0	0	0	3	0	0	1	1	1	0	1	1	1	0
Data Resources Inc.	2	3.07	1	1	0	0	1	1	0	0	0	0	1	1	0	2	0	0	1	1	0	0	2	0	0	0	0	1	1	0
Dialcom, Inc.	2	2.50	1	0	0	1	0	1	0	1	1	0	1	0	0	1	1	0	0	1	1	0	0	0	1	1	1	1	0	0
General Electric Co.	51	2.98	16	30	5	0	20	26	5	0	19	23	9	0	15	28	6	0	12	25	12	1	7	31	16	6	4	19	21	6
Honeywell Information Systems, Inc.	3	2.81	0	2	1	0	0	3	0	0	0	3	0	0	0	1	2	0	1	1	1	0	0	2	1	0	0	3	0	0
Interactive Data Corp.	2	2.57	0	1	1	0	0	2	0	0	0	1	1	0	0	2	0	0	0	2	0	0	0	0	2	0	0	1	0	1
International Time-sharing Corp.	7	3.20	2	5	0	0	2	5	0	0	2	5	0	0	2	4	0	0	1	4	1	0	3	1	2	0	2	3	2	0
Leasco Response, Inc.	6	2.63	1	4	0	0	1	1	3	0	1	1	3	0	0	3	1	1	0	1	4	0	0	2	2	1	2	2	1	0
Manufacturing Data Systems, Inc.	2	2.86	0	2	0	0	1	1	0	0	1	1	0	0	0	2	0	0	0	2	0	0	0	1	1	0	0	0	1	1
McDonnell Douglas Automation Co.	2	2.93	1	1	0	0	1	1	0	0	0	2	0	0	0	2	0	0	1	0	1	0	0	1	1	0	0	0	2	0
McGill University	3	2.90	0	2	1	0	1	1	1	0	0	3	0	0	2	1	0	0	1	1	0	1	1	0	1	1	1	0	1	0
Metridata Computing, Inc.	3	3.19	1	2	0	0	2	1	0	0	2	1	0	0	2	1	0	0	0	1	1	1	2	0	1	0	0	2	1	0
National CSS, Inc.	15	2.97	4	8	2	0	3	9	0	2	2	9	3	0	6	8	0	0	3	5	4	0	2	7	3	2	0	7	5	2
On-Line Systems, Inc.	5	3.03	1	3	0	0	1	3	0	0	2	2	1	0	2	2	0	1	1	3	0	0	1	2	2	0	0	2	2	0
Rapidata, Inc.	6	3.12	1	4	1	0	4	2	0	0	1	5	0	0	3	3	0	0	3	3	0	0	1	3	1	1	0	3	2	1
Remote Computing Corp.	5	2.74	1	2	1	1	1	3	0	1	1	1	2	1	1	3	0	0	1	3	0	1	0	4	0	1	1	2	2	0
Scientific Time Sharing Corp.	3	3.50	2	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	2	0	0	0	1	1	0	0	0	1	1	0
Service Bureau Corp.	28	3.01	9	17	2	0	10	12	6	0	10	13	5	0	6	17	5	0	6	17	4	0	10	12	5	1	2	7	16	3
Tymshare, Inc.	12	2.98	4	6	1	1	6	4	0	2	0	7	5	0	6	5	0	0	2	6	1	1	3	7	0	2	1	6	3	1
United Computing Systems, Inc.	8	2.79	2	4	2	0	4	1	3	0	3	2	2	1	2	4	2	0	2	3	1	2	2	0	4	2	0	5	3	0
University Computing Company	2	2.57	1	0	1	0	1	1	0	0	0	1	1	0	1	0	1	0	0	1	0	1	0	1	1	0	0	0	1	1
All others*	41	3.00	14	20	4	1	11	23	4	1	9	26	1	4	4	22	6	2	7	8	16	2	15	13	8	3	15	16	5	3

*Only the remote computing companies mentioned by two or more users are listed individually. The 41 companies rated by only one user each are combined in the "All others" entry.

**User's ratings are expressed in terms of number of user responses; the legend is E for Excellent, G for Good, F for Fair, and P for Poor. The "Weighted Average of All Ratings" was calculated by assigning a value of 4 to each Excellent rating, 3 to Good, 2 to Fair, and 1 to Poor.

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The remote computing applications reported by the survey respondents spanned virtually the entire spectrum of business and scientific applications. The reported applications can be broadly classified as follows:

Application	No. of Users	% of Total
Business (including accounting, market research, financial modeling, manufacturing, report generation, data base inquiry, etc.)	109	77
Scientific and engineering (including simulation, statistical analysis, graphics, etc.)	70	50
Program development	6	4
Educational	4	3

Thus, it is clear that among DATAPRO 70 subscribers, at least, remote computing services are now being used more heavily for business-related applications than for the scientific and engineering applications that spawned the industry.

SELECTING A REMOTE COMPUTING SERVICE

In most metropolitan areas of the United States, prospective remote computing users can choose from literally dozens of suppliers. Choosing the company that will provide you with the most effective service at the lowest overall cost isn't easy, but it can be done. What's needed is a straightforward, logical selection process that will guide you around the numerous pitfalls which await the unwary. The following procedure, if judiciously applied, will virtually assure the satisfaction of your remote computing requirements in a reliable, economical manner.

1. *Get all the help you can.* Remote computing is a complex, fast-changing field. Though the ultimate goal is to make life easier for computer users, selection of the most suitable commercial remote computing service requires consideration of complex and interrelated hardware, software, communications, and economic factors. Therefore, it's wise to learn as much as you can before making your choice. This report and other related material in DATAPRO 70 will help a lot. So will reading other articles and books, attending remote computing seminars, talking with various sales representatives, and studying their technical documentation. The services of an independent consulting firm with broad remote computing experience can also be well worth their cost.

2. *Define your requirements.* Before shopping for remote computing services, it's essential to know what you want them to do for you. Try to list all the reasonable applications for remote computing in your organization. Then rank these applications according to their relative importance and urgency. For each of the key applications, define the required computer functions – usually in terms of the inputs to be supplied, the calculations to be performed, the outputs to be produced, and their associated volumes. Specify the exact manner in which all computer inputs and outputs must interface with your existing procedures, forms, and/or data files, as well as any turn-around time requirements that must be met. Finally, determine the present overall cost of processing each application, so that you'll be in a position to know whether or not remote computing can really save you money.

3. *Survey the available remote computing services.* The first step in narrowing down the field is to find out which remote computing companies are actively marketing their services in your locality and collect the basic information about their capabilities, specialties, and pricing. The comparison charts in this report can help a lot. So can the Yellow Pages of your local telephone directory, the advertisements of the remote computing companies, and the experience of any acquaintances who are using remote computing. The salesmen for the various remote computing companies will usually be more than pleased to give you brief presentations describing their firm's capabilities and to present you with brochures, price schedules, and sample contract forms.

4. *Choose the most likely candidates.* Now it's time to reduce the list of contenders to the three to six that seem best able to meet your requirements. This can usually be accomplished by a selective "weeding out" process. You simply eliminate from consideration those suppliers that fail to measure up on one or more critical questions such as these:

   - Are the company's services available in your area at a competitive cost (including all communication and terminal costs)?
   - Does the company offer the programming and technical support services you need?
   - Does the company offer the specific programming languages and/or application programs you need?
   - Does the company support the type of terminal equipment you need (or already own)?

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- Can the company satisfy the requirements, if any, for compatibility with your existing programs and/or data files?

- Does the company appear to be able to meet your requirements for operational reliability and data security?

- Are you satisfied that the company is soundly financed and in the business to stay?

5. *Learn all you can about each remaining candidate.* Now it's time to call in the sales representatives of each of the remaining contenders for in-depth discussions about their capabilities, services, and pricing. By now you'll have a good idea what questions to ask them – and what answers you're looking for. Be sure to find out exactly what each company offers in the way of equipment configuration, program library, programming services, training, documentation, security measures, contract terms, etc. Get the details of each company's pricing structure, including possible "extra" charges for programming, training, manuals, application programs, and other products and services you'll need. Be sure to ask for reference lists of current users. Contact these users, and learn all you can about what their experiences have been; it's likely to be a remarkably informative exercise. Also, check the results of the Datapro user survey on page 70G-900-01h.

6. *Conduct benchmark tests.* This is probably the most important – and yet the most frequently ignored or misguided – phase of any remote computing selection project. The essence of benchmark testing is the actual preparation and execution of one or more problems which are representative of the user's planned computer workload. The purpose is threefold:

   - To find out exactly what's involved in using each supplier's services.

   - To determine the service availability, response time, and anticipated throughput that each supplier can deliver at both peak hours (usually around 10 to 11 a.m. and 3 to 4 p.m.) and off-peak times.

   - To determine the cost factors for each service on the types of problems you'll be running regularly.

   If you'll be writing your own programs, go ahead and prepare one or more of them, in the language of your choice. Then ask each of the prospective suppliers to loan you an appropriate terminal plus the computer time required to compile, test, and execute your programs. If you'll be using a ready-made application program supplied by the vendor, prepare some representative test data, borrow the necessary terminal, and give the program a real tryout. In either case, be sure to: (1) control all test conditions as carefully as you can; (2) make the benchmark programs and data as representative of your actual workload as time permits; (3) run each test at both peak and off-peak hours (and at the same times of day for all prospective suppliers); and (4) keep detailed records of all pertinent timing and cost data, as well as your impressions about the comparative ease or difficulty of using each service.

7. *Make your selection.* By now, you've amassed a great deal of pertinent information. Now it's time to "put it all together." From the results of your benchmark tests, calculate the estimated overall costs of satisfying all your remote computing needs with each supplier's services. Compare these costs with your present costs, and (if appropriate) with the estimated costs of alternative approaches such as a computer of your own or a conventional service bureau. In many cases, one of the remote computing suppliers will now stand out as a clear-cut choice. In others, it may be practical to contract with two or more suppliers and use the one whose offerings turn out to be the most economical for each of your applications.

   If neither of the above solutions is appropriate, you may want to turn to some type of weighted point scoring system, in which each supplier is awarded an appropriate number of points for every desirable characteristic (such as availability, response time, languages, terminals, application programs, costs, etc.). But frankly, if it still looks like a really close race, we'd recommend giving preference to the company that made the best showing on your benchmark tests; there's no more convincing evidence than impressive performance on your own problems.

8. *Negotiate a suitable contract.* At this point, virtually every remote computing company will ask you to sign its standard contract form. But that's not necessarily your best move. There's a good chance the supplier will offer considerably more favorable contract terms if that's what it takes to land your account. So read the contract carefully. Make sure it clearly defines the company's pricing structure, charges for all additional products and services, hours of service availability, length of commitment, termination provisions, etc. If the supplier writes any programs for you, make sure it's clear whose property they will be. If you're not completely satisfied with the standard contract terms, ask the supplier to amend them.

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You'll notice that most of the standard contracts disclaim any liability for damages arising either from the use of the suppliers' services or their failure to provide the agreed-upon services. If you feel you need more protection, such as guaranteed file security, it certainly can't hurt to ask for it. Discussions with other customers of the service may be especially helpful in this area. And the advice of your company's lawyer is likely to be well worth having to help ensure that you'll get the services and the protection you need.

9. *Make periodic re-evaluations.* Once you've selected the most suitable remote computing service for your needs, it's unwise to assume that it will *continue* to represent your best choice. As a remote computing network becomes more heavily loaded, its performance tends to degrade. As the network's saturation point is approached, the response times to each user's requests are likely to become unbearably long. In addition to user frustration, this condition leads to longer connect times and higher costs. Therefore, it's wise to rerun your benchmark problems every month or two under the original test conditions. This will enable you to spot any deterioration in the service and present your supplier with documentary evidence of the fact. If the supplier cannot satisfy you that the original quality of service will soon be restored, remember that numerous other suppliers are anxious for your business. And, if you've written your own programs and used one of the common programming languages, it should be relatively easy to make the switch.

THE COMPARISON CHARTS

The principal characteristics of 97 commercially available remote computing services are presented in the accompanying comparison charts. Except where otherwise indicated, all information in the charts was furnished by the suppliers in October 1973; their close cooperation with the Datapro Research staff in the preparation of these charts is greatly appreciated.

DATAPRO 70 sent repeated requests for information to more than 200 companies known or believed to be in the remote computing business. The 97 usable responses summarized in our charts represent a good cross-section of the commercial remote computing services that are currently available in the United States and Canada. *The absence of any specific company from our charts means that the company either failed to respond to our repeated information requests or was unknown to us.*

The comparison chart entries and their significance to potential remote computing users are explained in the following paragraphs, together with additional useful guidelines for selecting the remote computing service that will most effectively meet your needs.

General Information

Name of service. The name under which a company's commercial remote computing services are marketed may or may not be the same as the corporate name. Where they differ, this entry indicates the name of the remote computing service. Some suppliers offer several different levels of service with different names and capabilities, and in these cases the chart entries differentiate between the various levels.

Date operational. This entry tells when each company's remote computing services first became available for regular commercial use. Most remote computing networks require lengthy shakedown periods before settling down to normal operations, so the length of time a service has been operational may serve as a reasonable indication of its reliability – as well as its financial stability. But it is also important to note that few remote computing networks remain really stable for long periods of time; disruptions can occur at any time through addition or consolidation of computer centers, changes in systems software, communications breakdowns, etc.

Areas currently served. Each remote computing company was asked to state the geographical areas it can service effectively, and their answers are reported in the charts. Where specific cities are named, the companies generally offer toll-free service in those cities through local computer centers, communications multiplexers, or foreign exchange facilities.

Where a company professes to serve a large region (such as "Eastern Seaboard and Mid-West"), the implication is that the company either offers INWATS (Inward Wide Area Telephone Service) or maintains computer centers, multiplexers, or other toll-free entry points in strategic cities throughout the area. Unfortunately, this is not true in all cases. It's wise to contact all the companies whose services appear to meet your needs, and find out exactly what communications and computational facilities they offer in your area.

Equipment

Computers. This entry describes the number and type of central processors that each company currently employs in its remote computing network. The cities in which the computers are located are also indicated in most cases. The smaller supporting computers which are frequently used as communications processors or remote multiplexers are not listed here because of space limitations.

Space limitations have also precluded the reporting of configuration details such as main storage capacity, type and capacity of mass storage units, number and speed of central-site peripheral devices, etc. These configuration

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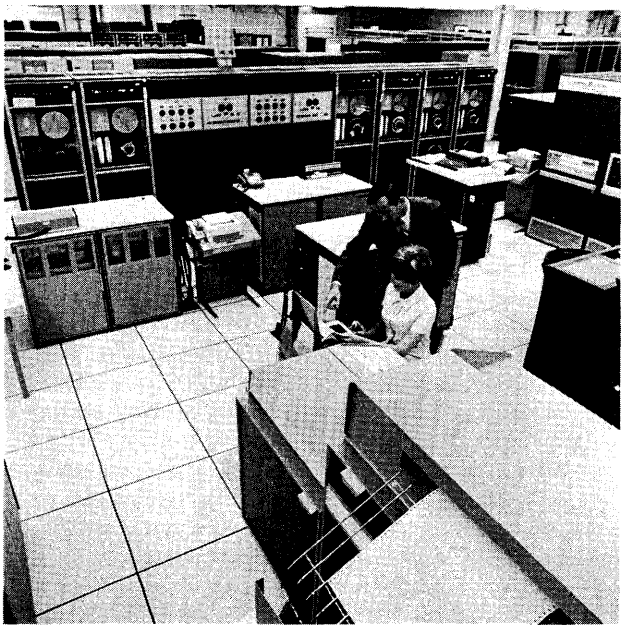
details may or may not be significant, depending upon your applications. Conventional scientific applications are typically coded in FORTRAN or BASIC, require little or no permanent file storage, and can be run without difficulty on most of the commercial remote computing systems. Conversely, many business data processing applications impose special requirements for mass storage units, central-site peripheral equipment, and compatibility with existing programs and data files. In these cases, it will be necessary to contact the remote computing vendors for details about their equipment configurations and capabilities.

Number of simultaneous users. This entry indicates the maximum number of users at remote terminals that each remote computing company claims to be able to serve simultaneously. This figure can serve as a useful – though far from precise – indication of the power of a remote computing system. The response time to each user's requests will naturally tend to increase as the number of simultaneous users gets larger, and in many cases an attempt to serve the indicated number of simultaneous users will lead to response times which are far too long for effective conversational-mode use.

Conversational terminals supported. The specific remote terminals that each remote computing system can accommodate for interactive, conversational-mode operations are listed in this entry. The abbreviation "TTY 33/35" stands for the Teletype Model 33 and Model 35 Teletypewriters, which are still by far the most widely used time-sharing terminals. These units have conventional typewriter-style keyboards and transmit an 11-unit ASCII code, usually at 110 bits per second. The Model 33 terminals are designed for "standard-duty" usage (up to about four hours a day) and are priced at about $450 to $1,300, depending on whether or not an integrated paper tape reader and punch and various options are included. The Model 35 terminals are functionally similar but are beefed up for heavy-duty usage, offer a broader range of options, and cost about three times as much as their Model 33 counterparts.

Teletype's newer Model 38 terminals are transmission-compatible with the model 33 and offer a 132-character print line and upper-and-lower-case printing at prices just above those of the Model 33. The Teletype Model 37 terminals, which feature a higher speed (15 characters per second) as well as expanded printing control facilities, are supported by comparatively few remote computing companies to date.

To capitalize upon the widespread acceptance of the Teletype Model 33 and 35 terminals, numerous peripheral equipment makers have introduced "Teletype-compatible" printers, display units, and other terminals which have the same interface characteristics and can utilize the same software support as the Teletype units.



Multiple Honeywell computers in a "supercenter" in Cleveland provide the computing power for users of the General Electric Company's international Information Services Network.

These Teletype-compatible terminals are described in the Peripherals section of DATAPRO 70. Examples include the GE TermiNet 300 and 1200, Memorex 1200 Series, NCR 260, Texas Instruments Silent 700 Series, and UNIVAC DCT 500 terminals, plus CRT display terminals such as the Hazeltine Model 1000 and 2000 and the ITT 3501 Asciscope. In general, any Teletype-compatible terminal can be connected to any remote computing network that supports the Teletype Model 33 or 35 Teletypewriters – but it will generally not be possible to take advantage of the replacement terminal's higher speed and/or improved functional capabilities unless the remote computing company makes suitable modifications in its equipment and supporting software.

The IBM 2741 is another widely supported conversational-mode terminal. Built around an IBM Selectric Typewriter, it provides keyboard input and typed output in both upper and lower case. Its rated transmission speed is 134.5 bits (14.8 characters) per second. The 2741, however, cannot be equipped with paper tape I/O or any other medium for local storage of programs or data.

Typewriter-style terminals that are compatible with the IBM 2741 are marketed by Anderson Jacobson, Computer Devices, GTE Information Systems, Harris, Memorex, Texas Instruments, and several other companies. All are described in the Peripherals section of DATAPRO 70. In addition to these and other typewriter terminals, many remote computing companies also support the use of CRT display units, digital plotters, and/or portable terminals.

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Although many of the remote computing companies offer to supply and maintain the terminals which their systems support, you'll retain more flexibility if you obtain your terminals from the manufacturer or some other independent source. The Teletype terminals, for example, can be leased from the various telephone companies or from sources such as the RCA Service Company and Western Union Data Services.

Batch terminals supported. In addition to the low-speed, conversational-mode terminals which are usually associated with time-sharing, many of the remote computing networks now support faster terminals designed for batch-mode transmission and reception of comparatively large volumes of data. Batch terminals greatly extend the spectrum of practical applications for remote computing systems by permitting the entry of previously recorded data and the printing of results at comparatively high speeds.

The most widely supported batch terminal is the IBM 2780 Data Transmission Terminal. Four models of the 2780 provide different combinations of card reading, card punching, and/or line printing capabilities, at transmission speeds ranging from 1200 to 4800 bits (150 to 600 characters) per second. Data is transmitted under IBM's Binary Synchronous Communications (BSC) line discipline technique in one of three codes: ASCII, EBCDIC, or Six-Bit Transcode. Rental prices for the 2780 range from about $680 to $1,255 per month, so its installation must be carefully justified by virtue of a real need for the faster input/output speeds it provides.

As in the case of the Teletype terminals, the widespread acceptance of the IBM 2780 has led to the introduction of competitive terminals which offer functional compatibility with the 2780, usually at lower prices. Examples include the Data 100 Model 70 and the Remcom 2780. Numerous "intelligent" (programmable) terminals, such as the Badger DTS-100, Data 100 Model 78, and Westinghouse 2550, can emulate the functions of the IBM 2780 and other popular batch terminals. And IBM itself now offers a pair of newer terminals, the 2922 and 3780, which perform the same functions as the 2780 at substantially higher speeds.

Many of the remote computing companies also support the use of small digital computers, such as the Honeywell (nee GE) 105, IBM 1130, IBM System/360 Model 20, and UNIVAC 9200, as remote batch terminals. These independently programmed computers can serve as "intelligent terminals," processing some data locally and providing great flexibility in their communications functions. Their costs, as might be expected, are comparatively high.

All the terminals mentioned above are described in detail in the Peripherals or Computers section of DATAPRO 70; please refer to the Index, beginning on page 70A-100-01a.

Software

Conversational programming languages. This entry lists the programming languages offered by each company for interactive use by customers at remote terminals. The term "conversational" implies a high degree of interaction between the programmer and the computer system throughout the program entry and debugging process.

In most cases, each statement of the source-language program is checked for proper syntax as the user enters it, and any necessary corrections can be made immediately. After the whole program has been entered and checked, one of two basic techniques is usually followed to get it into operation: the program may either be compiled into a machine-language object program and then executed in conventional fashion, or it may be executed immediately in an interpretive mode. Interpretive execution saves compilation time and facilitates program changes, but it also requires that each source-language statement be translated into the appropriate machine instructions every time it is executed – an inherently inefficient process.

FORTRAN and BASIC are by far the most popular conversational programming languages for remote computing use. Between the two, experienced computer users tend to favor FORTRAN because of its greater power and flexibility, while first-time users often choose BASIC because it is generally considered easier to learn and use.

FORTRAN has been most widely used scientific programming language for more than a decade. It uses symbols and expressions similar to those of algebra to express the procedures for performing computational and logical processes. Though it was designed strictly for scientific applications, FORTRAN has been successfully used for a wide range of business data processing functions as well. There are many different versions of the FORTRAN language, but conversions of FORTRAN programs from one version to another can usually be made with comparatively little difficulty. Thus, programs which are prepared and debugged in conversational mode can later be converted into efficient production programs through recompilation by a batch-mode compiler.

BASIC (Beginners' All-purpose Symbolic Instruction Code) was developed at Dartmouth College to provide nonprogrammers with the capability to write programs in an easy-to-use language that resembles standard mathematical notation. BASIC is well suited for use in conversational-mode programming and debugging, and has rapidly gained wide acceptance among suppliers and users of remote computing services. Like FORTRAN, BASIC was designed for scientific and mathematical programming but has also been successfully used for business data processing. Many of the remote computing companies offer extended "supersets" of the BASIC language which considerably increase its capabilities. (Note, however, that

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the use of these extended language facilities in your programs may effectively cause you to become "locked in" to the particular company that offers them.) Most of the existing BASIC compilers emphasize rapid compilation and ease of use rather than efficiency of object-program execution; efficient batch-mode compilers for the BASIC language are rare.

APL is a comparatively recent and noteworthy arrival on the remote computing language scene. Conceived in the early 1960's by Dr. Kenneth E. Iverson of IBM, APL was designed to permit clear, concise expression of computational algorithms. APL's proponents claim (with some justification) that it is "more powerful than FORTRAN and easier to learn than BASIC." APL uses a much larger set of symbols and operators and a considerably different syntax than either FORTRAN or BASIC. Its facilities for handling vectors and arrays are especially powerful, yet simple to use. Some of the commercial implementations of APL include file-handling and formatting facilities that make them quite effective for business as well as scientific applications. The conciseness of the language, however, is a mixed blessing in that it often makes APL programs hard to read and comprehend. Moreover, nearly all of the current implementations of APL are interpreters, which means that the efficiency of object-program execution is likely to be comparatively low.

Though COBOL is by far the most widely used programming language for business applications, comparatively few companies offer a conversational-mode COBOL compiler.

Other general-purpose languages offered in conversational implementations include ALGOL, CAL, JOVIAL, and PL/1, together with a variety of symbolic assembly languages. In addition, many of the remote computing companies offer special-purpose languages designed for specialized functions such as list processing (e.g., LISP and SNOBOL), text editing, and program debugging.

Batch-mode programming languages. The languages offered by each remote computing company for batch-mode (i.e., non-interactive) compilation are listed in this entry. In general, the batch-mode language processors place a considerably greater emphasis upon the generation of efficient object programs than do their conversational-mode counterparts. Therefore, their use can lead to substantial savings in computer time for "production" programs which are run on a regular basis. Batch-mode compilers for virtually every programming language currently in use are offered by one or more of the remote computing companies.

Principal applications. For most remote computing users, the range and capabilities of the available application programs rank among the most important factors in choosing a particular supplier. Thousands of dollars worth of programming efforts can often be saved through the use of suitable ready-made programs, and many of the remote computing companies now offer a broad spectrum of programs to choose from.

Because of space limitations, the main comparison charts show only the principal application areas supported by each company – and the entry "business & scientific" is used for the many suppliers that offer hardware and software designed to support both commercial and scientific applications. The special chart on the last two pages of this report shows which of 25 important classes of application programs are available from each of the remote computing companies.

Charges

One of the most complex and confusing aspects of the current remote computing scene is the pricing of the services. There has been no general agreement to date as to the best technique for accounting and charging for the system resources used by each customer. As a result, prospective users are confronted by a bewildering array of rate schedules. The diverse pricing policies make cost comparisons very difficult and accentuate the desirability of benchmark testing.

Some remote computing companies impose no minimum monthly charge, while a few charge *only* a single, all-inclusive monthly service fee and a number of companies offering specialized services bill their customers on a per-transaction or per-item basis. Most companies bill the user for each second of central processor time, while others include the processor time as part of the terminal connect charge. Some companies provide each user with a certain amount of "free" mass storage space, while others do not. Some companies impose a one-time charge for initiation of service, and some have special pricing schedules for certain application programs. In addition, there are usually separate charges for the use of central-site peripheral devices (such as card readers and printers), for punched cards and printer forms, and for extra programming manuals and training courses.

The principal pricing elements for each remote computing company, in both the interactive and remote batch modes, are summarized in the comparison chart entries under the "Charges" heading. The indicated rates are for prime-time use. Many suppliers offer lower rates during non-prime hours, and discounts for volume usage are common. Remember that in addition to the charges listed in the charts, users must bear the cost of their terminals, modems, and communications facilities.

Minimum monthly charge. This is the minimum charge, if any, that is imposed for each month of remote computing service. (The companies that impose no

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minimum charge will naturally be of particular interest to users who plan to deal simultaneously with several different suppliers.)

Terminal connect time. This entry shows the charge for each hour of time during which an interactive or remote batch terminal is "on-line" (i.e., connected to the central computer).

Central processor time. Most remote computing companies impose a specific charge for each minute (or second) of time during which the central processor is working on the user's program. In some cases, this charge varies with the amount of main memory occupied by the program. Other companies allocate their central processor charges on the basis of more complex units with names like "Core Unit" or "Computer Resource Unit." Typically, such units are functions of the amount of processor time, main memory space, and input/output activity required by each program.

Mass storage. Virtually every remote computing company has large-capacity disk or drum units at its computer site. Users can rent as much of this mass storage space as they need for on-line storage of programs and files, at the rates indicated in this entry. The storage space is usually rented in units of one track or sector, whose capacity depends upon the physical format of the available mass storage device. Storage charges may be computed on the basis of either the average or maximum amount of storage used during each month; it's important to find out which basis your prospective suppliers use. Discounts are frequently granted for large-volume storage requirements.

Comments

This final entry on the comparison charts is used to explain or amplify the preceding entries and/or to provide other pertinent information about each company's services.

SUPPLIERS

Listed below, for your convenience in obtaining additional information, are the headquarters addresses and telephone numbers of the 97 remote computing companies whose services are described in the comparison charts.

ACTS Computing Corporation, 29200 Southfield Road, Southfield, Michigan 48076. Telephone (313) 557-6800.

APL Services, Inc., 684 Whitehead Road, Trenton, New Jersey 08638. Telephone (609) 883-0050.

Applied Data Research, Inc., Timesharing Division, Route 206 Center, Princeton, New Jersey 08540. Telephone (609) 921-8550.

Applied Logic Corporation, 900 State Road, Princeton, New Jersey 08540. Telephone (609) 924-7800.

Axicom Systems, Inc., 615 Winters Avenue, Paramus, New Jersey 07652. Telephone (201) 262-8200.

Beloit Computer Center, Inc., 423 State Street, Beloit, Wisconsin 53511. Telephone (608) 365-2206.

Boeing Computer Services, Inc., 7598 Colshire Drive, McLean, Virginia 22101. Telephone (703) 356-6900.

Bowne Time Sharing, Inc., 345 Hudson Street, New York, New York 10014. Telephone (212) 741-4700.

Chi Corporation, 11000 Cedar Avenue, Cleveland, Ohio 44106. Telephone (216) 229-6400.

Community Computer Corporation, 185 West Schoolhouse Lane, Philadelphia, Pennsylvania 19144. Telephone (215) 849-1200.

The Computer Company, Inc., Seventh and Franklin Building, Richmond, Virginia 23219. Telephone (804) 644-1841.

Computer Innovations, 70 West Hubbard Street, Chicago, Illinois 60610. Telephone (312) 329-1561.

Computer Network Corporation (Comnet), 5185 MacArthur Boulevard, Washington, D.C. 20016. Telephone (202) 244-1900.

Computer Research Company, 200 North Michigan Avenue, Chicago, Illinois 60601. Telephone (312) 346-1331.

Computer Resource Services, Inc., 1600 West Camelback Road, Suite 1F, Phoenix, Arizona 85015. Telephone (602) 266-8444.

Computer Sciences Canada, Ltd., Room 367, Place du Canada, Montreal 101, Quebec. Telephone (514) 878-9811.

Computer Sciences Corporation, 650 North Sepulveda, El Segundo, California 90245. Telephone (213) 678-0311.

Computer Sharing Services, Inc., 2498 West Second Avenue, Denver, Colorado 80223. Telephone (303) 934-2381.

Computer Spectrum, Box 8666, Chattanooga, Tennessee 37411. Telephone (615) 396-3131.

Computercraft Services, Inc., 1200 Lincoln Street, Suite 301, Denver, Colorado 80203. Telephone (314) 962-8810.

Computility, Inc., 131 Tremont Street, Boston, Massachusetts 02111. Telephone (617) 423-6780.

Compu-Time, Division of ACTS Computing Corporation, 327 Orange Avenue, Daytona Beach, Florida 32104. Telephone (904) 255-7511.

Computone Systems, Inc., 361 East Paces Ferry Road N.E., Atlanta, Georgia 30305. Telephone (404) 261-0070.

Com-Share, Incorporated, P.O. Box 1588, Ann Arbor, Michigan 48106. Telephone (313) 761-4040.

Com-Share Limited, 41 Voyager Court North, Rexdale 605, Ontario. Telephone (416) 678-1363.

Control Data Corporation, Cybernet Services, 8100 34th Avenue South, Minneapolis, Minnestoa 55440. Telephone (612) 853-8100.

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This bank of Xerox Sigma 7 and 9 computers in Los Angeles serves users of Xerox Computer Services' Interactive Accounting System.

Cyphernetics Corporation, 175 Jackson Plaza, Ann Arbor, Michigan 48106. Telephone (313) 769-6800.

Data Resources Inc., 29 Hartwell Avenue, Lexington, Massachusetts 02173. Telephone (617) 861-0165.

Data-Tek Corporation, University City Science Center, 3401 Market Street, Philadelphia, Pennsylvania 19104. Telephone (215) 349-9900.

Datacrown Limited, 650 McNicoll Avenue, Willowdale, Ontario. Telephone (416) 499-1012.

Dataline Systems Limited, 40 St. Clair Avenue West, Toronto, Ontario. Telephone (416) 964-9515.

Datalogics, Inc., 12025 Shaker Boulevard, Cleveland, Ohio 44120. Telephone (216) 721-9035.

Dialcom, Inc., 1104 Spring Street, Silver Spring, Maryland 20910. Telephone (301) 588-1572.

Fedder Data Centers, Inc., 412 West Redwood Street, Baltimore, Maryland 21201. Telephone (301) 685-6773.

First Data Corporation, 400 Totten Pond Road, Waltham, Massachusetts 02154. Telephone (617) 890-6701.

First National Bank of Memphis, Timesharing Division, P.O. Box 62, Memphis, Tennessee 38101. Telephone (901) 523-5362.

Fulton National Bank, 55 Marietta Street, Atlanta, Georgia 30302. Telephone (404) 577-3500.

General Electric Company, Information Services Business Division, 7735 Old Georgetown Road, Bethesda, Maryland 20014. Telephone (301) 654-9360.

Genesee Computer Center, Inc., 20 University Avenue, Rochester, New York 14605. Telephone (716) 232-7050.

Grumman Data Systems Corporation, 1111 Stewart Avenue, Bethpage, New York 11714. Telephone (516) 575-3284.

GTE Data Services Incorporated, First Financial Tower, P.O. Box 1548, Tampa, Florida 33601. Telephone (813) 877-8021.

HDR Systems, Inc., 8404 Indian Hills Drive, Omaha, Nebraska 68114. Telephone (402) 393-5775.

Honeywell Information Systems, Inc., 2701 Fourth Avenue South, Minneapolis, Minnesota 55408. Telephone (612) 332-5200.

Information Systems Design, Inc., 7817 Oakport Street, Oakland, California 94621. Telephone (415) 562-4204.

Interactive Data Corporation, 486 Totten Pond Road, Waltham, Massachusetts 02154. Telephone (617) 890-1234.

Interactive Sciences Corporation, 60 Brooks Drive, Braintree, Massachusetts 02184. Telephone (617) 848-2660.

International Timesharing Corporation, I T S Building, Jonathon Industrex, Chaska, Minnesota 55318. Telephone (612) 448-3061.

ISC/Pryor Computer, 400 North Michigan Avenue, Chicago, Illinois 60611. Telephone (312) 644-5650.

Kaman Aerospace Corporation, Old Windsor Road, Bloomfield, Connecticut 06002. Telephone (203) 242-4461.

Keydata Canada, 74 Victoria Street, Toronto, Ontario. Telephone (416) 362-2688.

Keydata Corporation, 108 Water Street, Watertown, Massachusetts 02172. Telephone (617) 924-1200.

Leasco Response Incorporated, 20030 Century Boulevard, Germantown, Maryland 20767. Telephone (301) 428-0500.

Management Systems Corporation, 215 North State Street, Salt Lake City, Utah 84103. Telephone (801) 363-1511.

Manufacturing Data Systems, Inc., 320 North Main Street, Ann Arbor, Michigan 48104. Telephone (313) 761-7750.

Mark/Ops, Division of Northeastern Systems Associates, Inc., 475 Commonwealth Avenue, Boston, Massachusetts 02215. Telephone (617) 266-1930.

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McDonnell Douglas Automation Company, P.O. Box 516, St. Louis, Missouri 63166. Telephone (314) 232-8071.

Merlin Systems Corporation, 1044 Northern Boulevard, Roslyn, New York 11576. Telephone (516) 484-4545.

Metridata Computing, Inc., P.O. Box 21099, Louisville, Kentucky 40221. Telephone (502) 361-7161.

Multiple Access Limited, 885 Don Mills Road, Don Mills, Ontario. Telephone (416) 443-3900.

National CSS, Inc., 300 Westport Avenue, Norwalk, Connecticut 06581. Telephone (203) 853-7200.

Ohio Valley Data Control, Inc., 2505 Washington Boulevard, Belpre, Ohio 45714. Telephone (614) 423-9501.

On-Line Business Systems, Inc., One Embarcadero Center, San Francisco, California 94111. Telephone (415) 391-9555.

On-Line Systems Inc., 115 Evergreen Heights Drive, Pittsburgh, Pennsylvania 15229. Telephone (412) 931-7600.

Pacific Applied Systems, Inc., 4835 Van Nuys Boulevard, Suite 108, Sherman Oaks, California 91403. Telephone (213) 986-7515.

Pacific International Computing Corporation, 50 Beale Street, San Francisco, California 94105. Telephone (415) 764-7652.

Paden Data Systems, Inc., 5838 Live Oak, Dallas, Texas 75214. Telephone (214) 823-3773.

Philco-Ford Corporation, Computer Services Network, 515 Pennsylvania Avenue, Fort Washington, Pennsylvania 19034. Telephone (215) MI 6-8600.

Phoenix Data Limited, 550 Berry Street, Winnipeg, Manitoba R3H OR9. Telephone (204) 786-5831.

PRC Computer Center, Inc., 7670 Old Springhouse Road, McLean, Virginia 22101. Telephone (703) 893-4880.

Profile Technology, Inc., Collegedale, Tennessee 37315. Telephone (615) 396-3131.

Programs & Analysis, Inc., 21 Ray Avenue, Burlington, Massachusetts 01803. Telephone (617) 272-7723.

Proprietary Computer Systems, Inc., 16625 Saticoy Street, Van Nuys, California 91406. Telephone (213) 781-8221.

Rapidata, Inc., 20 New Dutch Lane, Fairfield, New Jersey 07006. Telephone (201) 227-0035.

Remote Computing Corporation, 525 University Avenue, Suite A40, Palo Alto, California 94301. Telephone (213) 629-2532.

SBC Data Services, Division of the Service Bureau Corporation, P.O. Box 402, Paramus, New Jersey 07652. Telephone (201) 262-8700.

Scientific Process & Research, Inc., 24 North Third Avenue, Highland Park, New Jersey 08904. Telephone (201) 846-3477.

Scientific Time Sharing Corporation, 7316 Wisconsin Avenue, Bethesda, Maryland 20014. Telephone (301) 657-8220.

Sci-Tek Incorporated, 1707 Gilpin Avenue, Wilmington, Delaware 19899. Telephone (302) 658-2431.

The Service Bureau Corporation, 500 West Putnam Avenue, Greenwich, Connecticut 06830. Telephone (203) 661-0001.

I.P. Sharp Associates Limited, Suite 4206, Box 71, Toronto Dominion Centre, Toronto, Ontario. Telephone (416) 364-5361.

The Singer Company, Singer Information Systems Network, 30 Rockefeller Plaza, New York, New York 10020. Telephone (201) 256-5004.

Statistical Tabulating Corporation, 2 North Riverside Plaza, Chicago, Illinois 60606. Telephone (312) 346-7300.

Structural Dynamics Research Corporation, 5729 Dragon Way, Cincinnati, Ohio 45227. Telephone (513) 272-1100.

Systems Dimensions Limited, 770 Brookfield Road, Ottawa, Ontario K1V 6J5. Telephone (613) 731-6910.

Technical Advisors, Inc., 4455 Fletcher Street, Wayne, Michigan 48184. Telephone (313) 722-5010.

Technology for Information Management, Inc., 1654 Central Avenue, Albany, New York 12205. Telephone (518) 869-0928.

Tel-A-Data, Inc., 1500 Northwest 167th Street, Miami, Florida 33169. Telephone (305) 625-8266.

Telstat Systems, Inc., 150 East 58th Street, New York, New York 10022. Telephone (212) 826-0640.

Texas Instruments Incorporated, Information Services Division, P.O. Box 5621, Mail Station 933, Dallas, Texas 75229. Telephone (214) 238-3374.

Time Sharing Resources, Inc., 777 Northern Boulevard, Great Neck, New York 11022. Telephone (516) 487-0101.

Tymshare, Inc., 10340 Bubb Road, Cupertino, California 95014. Telephone (408) 257-6550.

Uni-Coll, 3401 Market Street, Philadelphia, Pennsylvania 19104. Telephone (215) EV 7-3890.

United Computing Systems, Inc., 3130 Broadway, Kansas City, Missouri 64111. Telephone (816) 221-9700.

University Computing Company, 7720 North Stemmons Freeway, P.O. Box 47911, Dallas, Texas 75247. Telephone (214) 741-5781.

USS Engineers and Consultants, Inc., 600 Grant Street, Pittsburgh, Pennsylvania 15230. Telephone (412) 433-6515.

Westinghouse Tele-Computer Systems Corporation, 2040 Ardmore Boulevard, Pittsburgh, Pennsylvania 15221. Telephone (412) 256-7799.

Xerox Computer Services, 5310 Beethoven Street, Los Angeles, California 90066. Telephone (213) 390-3461. □

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COMPANY	ACTS Computing Corporation	APL Services, Inc.	Applied Data Research, Inc.	Applied Logic Corporation	Axicom Systems, Inc.
GENERAL					
Name of service	ACTS RJE and Timesharing	Action/APL	Teleplex	AL/COM	Tymsharing
Date operational	Feb. 1969	July 1970	Nov. 1969	1967	Jan. 1969
Areas currently served	Michigan, Ohio, and the Midwest; New York, Los Angeles, and Oklahoma	Local dial service in New York City Boston, Phila., Atlanta, Houston, Miami, Tallahassee, Hartford, Princeton	Toll-free dial-up service throughout continental U.S.; multiplexers in Boston, Chicago, New York, Phila., Princeton	Toll-free access in 19 states in the East, Midwest, and Far West; service centers in 8 cities	Middle Atlantic States, New England, and Southeastern U.S.
EQUIPMENT					
Computers	Honeywell 430 & 440 in Detroit; Honeywell 430 & 440 in Daytona, Fl; IBM 370/155 (RJE) in Grand Rapids	IBM 370/155 in Richmond, Va.	DEC PDP-10 (2) in Princeton, N.J.	DEC PDP-10 (8) in Princeton, N.J.	UNIVAC 1108 (2) in Paramus, N.J.; UNIVAC 418 (2) in Greenville, S.C.
No. of simultaneous users	197 total	96	64	200	64
Conversational terminals supported	Any 10, 15, or 30 cps terminal using ASCII, EBCDIC, BCD, or correspondence code	IBM 2741 and compatible units at 15 or 30 cps; AJ 630, AJ 840, Memorex 1240, etc.	Any full-duplex ASCII terminal at 10 or 30 cps	Any ASCII terminal at 10 or 30 cps	TTY 33/35 and compatible units
Batch terminals supported	IBM 2770, 2780, 2922, 3780, 360/20, System/3; Data 100 Models 70, 74, 78	—	Data 100, IBM 2780, UNIVAC DCT 2000, and compatible units	IBM 2780 & compatible units	UNIVAC 1004 & 9200 and "all intelligent terminals"
SOFTWARE					
Conversational programming languages	FORTRAN, COBOL, PDP-8 & PDP-11 Assembler	APL	FORTRAN, BASIC, COBOL, Macro-10, AID, SNOBOL	FORTRAN BASIC, COBOL, SNOBOL, LISP, Macro-10, AID	FORTRAN, BASIC, COBOL, APL, Assembler
Batch-mode programming languages	FORTRAN, COBOL, PL/1, RPG	—	FORTRAN, COBOL, BASIC, Macro-10, SNOBOL	—	FORTRAN, COBOL, Assembler
Principal applications	Business & scientific	Business & scientific	Business & scientific	Business & scientific	Scientific & message switching
CHARGES					
Min. monthly charge:					
Interactive	$100	$100	None	$100 (after 2 mo.)	None
Remote batch	None	—	None	—	Not specified
Terminal connect time:					
Interactive	$10/hr.	$10-15/hr.	$10/hr.	$10/hr.	$10/hr.
Remote batch	None	—	$25/hr.	—	Not specified
Central processor time:					
Interactive	$0.06/second	$24/min.	$0.01/RAM	$0.10/Core Unit	$8.40/min.
Remote batch	$250/hr.	—	$0.01/RAM	—	Not specified
Mass storage:					
Interactive	$1.00/1000 chars./month	$8-10/million bytes/day	$0.45/1000 chars./month	$3.75/5120 chars./month	$0.04/11,000 chars./day
Remote batch	$0.50/cylinder/month	—	$0.45/1000 chars./month	—	Not specified
COMMENTS	Subsidiary of Lear Siegler, Inc. Reduced rates for non-prime time. Remote Job Entry service uses HASP Multileaving.	Offers large file capabilities and shared files for data base manipulation. Affiliated with The Computer Company	Reduced rates for non-prime time and volume usage.	Offers deferred unattended execution at reduced rates. Volume discounts of 40 to 70% on mass storage. Offers full ANS COBOL.	

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COMPANY	Beloit Computer Center, Inc.	Boeing Computer Services, Inc.	Bowne Time Sharing, Inc.	Chi Corporation	Community Computer Corporation
GENERAL					
Name of service	BCC/ATS and BCC/RJE	Mainstream and CTS	Word/One	Chi Time-Sharing, Chi Remote Batch	—
Date operational	Nov. 1969	May 1970	Nov. 1969	May 1969	Jan. 1969
Areas currently served	Dial-up access in Beloit & Janesville, Wis.; Rockford & Chicago, Ill.; New York City; Washington, D.C.	Continental U.S. and Canada via nationwide data network and communication system	Atlanta, Boston, Chicago, New York, New Jersey, Phila., and Washington, D.C. areas	Ohio, Pennsylvania, Michigan, New York	Delaware Valley, New Brunswick, N.J.
EQUIPMENT					
Computers	IBM 360/50 in Beloit, Wis.	IBM 370/168 in McLean, Va. (Mainstream); IBM 370/158 in Wichita, Kan. (CTS)	IBM 370/155 in New York City	UNIVAC 1108 & Honeywell 430 in Cleveland	HP 2116B (2) in Philadelphia
No. of simultaneous users	200	80 on Mainstream; 90 on CTS	175	60 total	32
Conversational terminals supported	IBM 2741, AJ 841, Trendata 1000, Novar 5-41 & 5-50, Datel, Datapoint, etc.	TTY 33/35 and compatible units at 10 or 30 cps; IBM 2741 and compatible units at 14.8 cps	IBM 2741, TTY, and compatible units at 10, 14.8, 15, or 30 cps	TTY 33/35/38, Datapoint 3300, GE TermiNet 300, UNIVAC DCT 500, etc., at 10 or 30 cps	TTY and other ASCII-coded terminals at 10 or 30 cps
Batch terminals supported	IBM 2780, 3780, 360/20, System/3; Data 100, NCR 399, Remcom, Sycor, etc.	IBM 2780, 3780, 360/20, 1130, or any other HASP RJE terminal	—	UNIVAC 1004, 9200; IBM 2780, 1130, 360/20; Data 100, etc.	—
SOFTWARE					
Conversational programming languages	ATS (Administrative Terminal System)	FORTRAN, COBOL, ALGOL, BASIC, PL/1, APL, etc. (all in CTS only)	Word/One (text editing)	BASIC, FORTRAN, EDIT, SAM	BASIC
Batch-mode programming languages	FORTRAN, COBOL, PL/1, Assembler, Foresight	FORTRAN, COBOL, PL/1, ALGOL, Assembler	—	FORTRAN, BASIC, ALGOL, COBOL, RPG, etc.	FORTRAN, ALGOL
Principal applications	Business & scientific	Business & scientific	Text editing & typesetting	Business, scientific, & phototypesetting	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	$50	None	$150 (after 3 mo.)	None	None
Remote batch	None	None	—	Not specified	—
Terminal connect time:					
Interactive	$2.00-3.50/hr.	$9-11/hr.	$2.65-4.80/hr.	$6.00/hr.	$8.00/hr.
Remote Batch	$10-15/hr.	$8-16/hr.	—	Not specified	—
Central processor time:					
Interactive	$5.00-7.80/min.	$21.60/min.	$0.09/Proc. Unit	$3.60/min.	None
Remote batch	$5.00-7.80/min.	$15.00/min.	—	Not specified	—
Mass storage:					
Interactive	$0.13/1000 chars./month	$10-18/cylinder/month	$0.28/1550 chars./month	$0.25/1152 chars./month	$0.20/160 chars./month
Remote batch	$0.065/1000 chars./month	Not specified	—	Not specified	—
COMMENTS	Features ATS text editing system	Charges shown are for CTS service. Mainstream service offers RJE at a range of service times (10 minutes to overnight) and charges.	Specializes in text editing, typesetting, and address file maintenance. Volume discounts available.	Offers both time-sharing and remote batch services. Substantial volume discounts. Lower rates for non-prime time.	Storage beyond 80,000 characters is priced at $0.04/160 chars./month.

All About Remote Computing Services

COMPANY	The Computer Company	Computer Innovations	Computer Network Corp. (Comnet)	Computer Research Company	Computer Resource Services, Inc.
GENERAL					
Name of service	Action/APL	Advanced APL, Enhanced ATS	Alpha	–	Response
Date operational	Oct. 1969	June 1969	Dec. 1967	Sept. 1971	1969
Areas currently served	Boston, Chicago, Denver, Hartford, Los Angeles, Miami, Newark, New York, Phila., D.C., and 6 other cities.	Illinois, Indiana, Michigan, Minnesota, Wisconsin	Continental U.S. via INWATS; local dial-up access in the New York, Washington, & Pittsburgh areas	Midwestern U.S. via Band 2 INWATS	Phoenix metropolitan area
EQUIPMENT					
Computers	IBM 370/155 in Richmond, Va.	IBM 360/65 in Van Nuys, Calif.	IBM 360/65 (2) in Washington, D.C.	IBM 370/158 in Chicago	HP 2000 (2) in Phoenix, Ariz.
No. of simultaneous users	156	120	75	20	32
Conversational terminals supported	IBM 2741, TTY 33, AJ, CDI, Datel, HP 7200, Memorex 1240, Novar, Tektronix	Selectric/ASCII type terminals	IBM 2741, TTY 33/35, and compatible units at 10 to 120 cps	TTY 33/35, IBM 2741 & 3270, Datapoint, etc.	Any ASCII or Correspondence Code terminal at 10 to 30 cps
Batch terminals supported	–	–	IBM 2780, 1130, 360/20, and compatible units at 2000 to 9600 bps	IBM 2780, 360/20, System/3; Data 100	–
SOFTWARE					
Conversational programming languages	APL	APL	All OS/360 languages	FORTRAN, COBOL, PL/1, Assembler	BASIC
Batch-mode programming languages	–	All OS/360 languages	All OS/360 languages	FORTRAN, COBOL, PL/1, Assembler	–
Principal applications	Business & scientific	Business, scientific, & text editing	Business & scientific	Business, scientific, & text editing	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	None	None	$100	None	$25
Remote batch	–	–	$100	None	–
Terminal connect time:					
Interactive	$10-13/hr.	$12.50/hr.	$12/hr. (to 120 cps)	$7.50/hr. (TSO)	$8/hr.
Remote batch	–	–	$20-36/hr.	$10/hr. (RJE)	–
Central processor time:					
Interactive	$24/min.	$12.50/min.	$0.20/CUU	$10.80/min. (TSO)	None
Remote batch	–	–	$0.20/CUU	$7.20/min. (RJE)	–
Mass storage:					
Interactive	$300/million bytes/month	$12.50/million bytes/day	$1.00/7296 chars./month	$0.024/1000 chars./day	$0.75/1024 chars./month
Remote batch	–	–	$1.00/7296 chars./month	$0.024/1000 chars./day	–
COMMENTS	Offers remote job entry and file management system for shared files.	Affiliated with Proprietary Computer Systems, Inc.	Offers "OS-compatible time-sharing services" and remote job entry at a wide range of service times, terminal speeds, and charges	Offers System/370 batch RJE, TSO, IMS, and ATS. Reduced rates for non-prime time. CPU charges above are for 60K bytes of main storage.	$50 initiation fee.

All About Remote Computing Services

COMPANY	Computer Sciences Canada, Ltd.	Computer Sciences Corporation	Computer Sharing Services, Inc.	Computer Spectrum	Computercraft Services, Inc.
GENERAL					
Name of service	Infonet	CSTS	DTSS, TSS	The Computer Spectrum	Computercraft
Date operational	July 1967	Jan. 1970	Nov. 1967	Sept. 1972	Nov. 1970
Areas currently served	Calgary, Edmonton, Montreal, Ottawa, Quebec, Toronto, Vancouver, Winnipeg	Local access in 23 metropolitan areas throughout continental U.S.	Colorado and the Mountain States via leased lines and INWATS	Southeastern U.S.: AL, FL, GA, KY, LA, MS, NC, SC, and TN	Denver, St. Louis, Detroit, & Chicago areas; local dial-up service available in 15 other cities nationwide
EQUIPMENT					
Computers	UNIVAC 1108 (2); 1 in Toronto and 1 in Calgary	UNIVAC 1108 (8); 5 in El Segundo, Calif., and 3 in Oak Brook, Ill.	Honeywell 635 & Honeywell 430 in Denver	HP 2000F & Spectrum 3000 in Chattanooga, Tenn.	DECsystem 1050 (4) in Columbus, Ohio
No. of simultaneous users	180 total	400-640 total	140 total	48 total	252 total
Conversational terminals supported	TTY 33/35 and compatible units at 10, 15, or 30 cps; IBM 2741 or equivalent	TTY 33/35 and compatible units at 10, 15, or 30 cps; IBM 2741 or equivalent	TTY 33/35, IBM 2741, and compatible units at 10, 14.8, 15, 30, or 120 cps	TTY and any other ASCII terminal at 10, 15, 30, 60, 120, or 240 cps	TTY and any other ASCII terminal at 10, 15, or 30 cps; Selectric terminals at 14.8 cps
Batch terminals supported	IBM 2780 & 1130, UNIVAC 9200, 1004, & DCT 2000, Honeywell Series 200, etc.	IBM 2780 & 1130, Data 100, Remcom 2780, Qantel, M&M, etc.	IBM 2780 and compatible units (in 1st quarter 1974)	—	DEC PDP-8 and PDP-11 computers
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC	FORTRAN, BASIC, COBOL, Assembler	FORTRAN, BASIC, COBOL, ALGOL, APL, LISP, SNOBOL, QED, GMAP	FORTRAN, BASIC, Assembler	FORTRAN, BASIC, COBOL, AID, SNOBOL, LISP, Macro 10
Batch-mode programming languages	FORTRAN, COBOL, Assembler	FORTRAN, BASIC, COBOL, Assembler	All conversational languages can be used in background or batch mode	FORTRAN, COBOL, Assembler	FORTRAN, BASIC, COBOL, GASP, SNOBOL, Macro 10
Principal applications	Business & scientific	Business & scientific	Business & scientific	Business, scientific, & educational	Business & Scientific
CHARGES					
Min. monthly charge:					
Interactive	$25	$25	$35	$70	None
Remote batch	$25	$25	$35	—	—
Terminal connect time:					
Interactive	$11.25-13.25/hr.	$11-15/hr.	$5-6/hr.	$7/hr.	$9-13/hr.
Remote batch	$11.50/hr.	$10/hr. (2000 bps)	$5-6/hr.	—	—
Central processor time:					
Interactive	$0.70/sec.	$0.25/SRU	$0.05-0.25/sec.	None	$0.02/SRU
Remote Batch	$0.21-0.45/sec.	$0.05-0.25/SRU	$0.05-0.25/sec.	—	—
Mass storage:					
Interactive	$1.50/3072 chars./month	$0.025/2048 chars./day	$2.00/4096 chars./month	$0.33/1000 chars./month	$1.50/3200 chars./month
Remote batch	$0.065/10,752 chars./day	$0.025/2048 chars./day	$2.00/4096 chars./month	—	—
COMMENTS	CPU charges for remote job entry vary with priority. Discounts for high-volume usage.	CPU charges for remote batch use vary with priority. Discounts for high-volume usage. Lower rates for non-prime time.	Honeywell 635 is first commercial installation of Dartmouth Time-Sharing System. All Dartmouth programs are available.	Specializes in educational, information retrieval, inventory control, personnel, school administration, and text editing applications.	Marketing affiliate of Compu-Serv Network, Inc., of Columbus. Also offers batch processing on IBM 370/135 and 360/40

All About Remote Computing Services

COMPANY	Computility, Inc.	Compu-Time Div., ACTS Computing Corporation	Computone Systems, Inc.	Com-Share, Incorporated	Com-Share Limited
GENERAL					
Name of service	Comp/Utility	Compu-Time	–	Commander I & Commander II	Com-Share
Date operational	June 1969	Oct. 1967	1966	1967	1969
Areas currently served	Middle Atlantic and Northeastern States; also national INWATS service	Southeastern U.S.; Fla., Ga., N.C., S.C., Ky., Tenn., Ala., La.	Entire U.S. via national INWATS service	Continental U.S.; multiplexers in 31 cities and foreign exchange lines in 27 others	Multiplexers in Montreal, Ottawa, Hamilton, & London; local dial-up service in Toronto; also see Comments
EQUIPMENT					
Computers	DECsystem 1077 in Boston	Honeywell 430 and Honeywell 440 in Daytona Beach, Fla.	IBM 360/50 in Atlanta	Xerox 940 (9) and Sigma 9 (3) in Ann Arbor, Mich.	Xerox Sigma 9 in Toronto
No. of simultaneous users	128	94	48	42 per 940, 64 per Sigma 9	64
Conversational terminals supported	Any ASCII terminal	TTY 33/35/38, GE TermiNet 300, Datapoint 3300; most 10 & 30 cps terminals	TTY, TI, Memorex 120 cps; Keypact portable insurance terminal (made by Computone)	TTY 33/35 and any compatible unit at 10, 30, or 60 cps	TTY 33/35 and compatible units.
Batch terminals supported	–	–	–	IBM 2780 & 3780, Remcom 2780 & 4780, Data 100 Model 70, Mohawk 2400, etc.	IBM 2780 and compatible units (as of Jan. 1974)
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC, COBOL, ALGOL, AID, LISP, Macro 10	FORTRAN, BASIC	–	FORTRAN, BASIC, CAL, SNOBOL, TAP, etc.	FORTRAN, BASIC, COBOL, APL, SNOBOL, QED, Metasymbol
Batch-mode programming languages	FORTRAN, BASIC, COBOL, ALGOL, SNOBOL, LISP, Macro 10	FORTRAN, COBOL, RPG	–	FORTRAN, COBOL, BASIC	FORTRAN, BASIC, COBOL APL, SNOBOL, QED, Metasymbol
Principal applications	Business & scientific	Business & scientific	See Comments	Business & scientific	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	None	$50	–	None	$100
Remote batch	None	–	–	None	$100
Terminal connect time:					
Interactive	$8/hr.	$10/hr.	–	$7.20-20.00/hr.	$8-12/hr.
Remote Batch	None	–	–	$8.40/hr. plus $0.15/10,000 chars.	$8-12/hr.
Central processor time:					
Interactive	$0.03/sec.	$0.06/Unit	–	$0.03-0.07/CCU	$0.08-0.10/CCU
Remote batch	$0.015/sec.	–	–	$0.03-0.07/CCU	$0.08-0.10/CCU
Mass storage:					
Interactive	$0.25/640 chars./month	$1.50/1620 chars./month	–	$0.30/2048 bytes/month	$0.20-0.80/1000 bytes/month
Remote batch	$0.25/640 chars./month	–	–	$0.30/2048 bytes/month	$0.20-0.80/1000 bytes/month
COMMENTS	Core memory is charged at the rate of $0.01/1024 words/second.	$100 initiation fee. Offers guaranteed maximum hourly rates, with substantial volume discounts.	Dedicated system for life insurance sales, feed and meat formulation, and turkey market information. Prices upon request.	Commander II service provides time-sharing, remote batch, and data management facilities. Datagrid is Com-Share's nationwide comm. network.	Offers service in most major Canadian cities via Dataline 2 and Dataroute. An affiliate of Com-Share, Inc.

All About Remote Computing Services

COMPANY	Control Data Corporation	Cyphernetics Corporation	Data Resources Inc.	Data-Tek Corporation	Datacrown Limited
GENERAL					
Name of service	Cybernet	Cyphernet System	DRI Economic Info. System	—	Shared Processing
Data operational	1971	Aug. 1969	Sept. 1969	Dec. 1971	June 1972
Areas currently served	Entire U.S. via nationwide communications network	Full service offices in 15 cities throughout the U.S., plus London, Brussels, and The Hague; also serves many other cities.	All major U.S. cities plus Montreal, Quebec, Toronto, & Central Europe, all via local-call access	New York, New Jersey, and Pennsylvania (Area Codes 201, 212, 215, 609, & 717)	All of Canada (via Dataroute, Bell Multicom, & CNCP) plus United States
EQUIPMENT					
Computers	CDC 6400 (4) in Rockville, Md.	DECsystem-10 (9) in Ann Arbor, Mich.	Burroughs B 6700 and B 7700 in Lexington, Mass. (both are duplex systems)	Xerox Sigma 9 in Plainfield, N.J.	IBM 370/168 in Willowdale, Ont.
No. of simultaneous users	512 total	300 total	Over 275 total	64	Not specified
Conversational terminals supported	ASCII-compatible units at 10 or 30 cps; Correspondence units at 14.8 cps.	All 10, 14.8, and 30 cps terminals, including extensive support for Tektronix graphic terminals	TTY-compatible units at 10, 15, 30, 60 or 120 cps; IBM 2741; AT&T Dataspeed 40	TTY-compatible units at 10, 15, or 30 cps	IBM 2741, 2260, 3270, 3735; Sycor 250; Vucom I; TI Silent 700; TWX; etc.
Batch terminals supported	CDC 200 User Terminal and compatible units at 2000, 3600, or 4800 bps	IBM 2780 and compatible units	IBM 2780, Burroughs DC 1100, or equivalent units	—	IBM, Data 100, Remcom, Sycor, Mohawk, Singer, etc.
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC, COBOL, APL, Simula, Simscript	FORTRAN, BASIC, COBOL, Macro 10	FORTRAN, BASIC, COBOL, APL, PL/1, AID, Simula, etc.	FORTRAN, BASIC, COBOL, APL, SNOBOL, Metasymbol	TSO Command Language
Batch-mode programming languages	FORTRAN, BASIC, COBOL, ALGOL, Compass, etc.	FORTRAN, BASIC, COBOL, Macro 10	FORTRAN, BASIC, COBOL, APL, PL/1, AID, Simula, etc.	FORTRAN, BASIC, COBOL, APL, SNOBOL, Metasymbol	FORTRAN, COBOL, PL/1, ALGOL, Assembler
Principal applications	Business & scientific	Business & scientific	Business & scientific	Business & scientific	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	None	None	$125	$10	None
Remote batch	None	None	None	$10	None
Terminal connect time:					
Interactive	$8-15/hr.	$10-15/hr.	$10/hr.	$10/hr.	$6-9/hr.
Remote batch	$10/hr.	Variable	$40-60/hr.	$15/hr.	$6-9/hr.
Central processor time:					
Interactive	$12/min.	$1.20/min	$36-54/min.	$0.15-0.30/sec.	$25/min.
Remote batch	$12/min.	$0.60-1.20/min.	$36-54/min.	$0.12-0.25/sec.	$15/min.
Mass storage:					
Interactive	$0.21-0.36/1280 chars./month	$0.06-1.00/1000 chars./month	$0.20-0.80/1000 chars./month	$0.50/1000 chars./month	$0.015/track/day (IBM 3330)
Remote batch	$0.12-0.36/1280 chars./month	$0.06-1.00/1000 chars./month	$0.20-0.80/1000 chars./month	$0.50/1000 chars./month	$0.015/track/day (IBM 3330)
COMMENTS	Also see Service Bureau Corporation, which is now a subsidiary of Control Data Corp.	International data communications network can link any client to any system. Charges depend upon volume and type of contract.	Specializes in economic planning and analysis; offers Economic Information System at a fee of $1500 to $18,000/year.	Offers municipal bonds program.	Offers discounts for volume usage and non-prime time. Dedicated high-speed access ports available.

All About Remote Computing Services

COMPANY	Dataline Systems Limited	Datalogics, Inc.	Dialcom, Inc.	Fedders Data Centers, Inc.	First Data Corporation
GENERAL					
Name of service	Dataline Interactive System	DL/70	–	–	–
Date operational	Sept. 1969	Jan. 1969	July 1970	1959	1969
Areas currently served	All of Canada (via multiplexers, foreign exchanges, and Dataroute)	Ohio	Middle Atlantic States; local service in Washington, D.C., Baltimore, New York, & Philadelphia	U.S. and Canada	New England and Middle Atlantic States
EQUIPMENT					
Computers	DECsystem-10 (3) in Toronto	Xerox Sigma 7 in Cleveland	Honeywell 1648A (2) in Silver Spring, Md.	IBM 370/155 in Baltimore	DEC PDP-10 (4) in Waltham, Mass.
No. of simultaneous users	185 total	Over 50	128 total	Over 200	Over 100
Conversational terminals supported	TTY 33/35, IBM 2741, and compatible units; all ASCII CRT's	TTY 33/35 and all compatible units at 10 or 30 cps	TTY and other ASCII terminals at 10 or 30 cps; Correspondence units at 14.8 cps	–	"All available terminals" (TTY, IBM 2741, and compatible units)
Batch terminals supported	IBM 2780 and compatible units	–	–	Fedder APT-1000, Fedder Fastback, or any IBM-compatible RJE terminal	FDC-73
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC, COBOL, APL, ALGOL, LISP, SNOBOL, Macro-10	FORTRAN, BASIC, COBOL	FORTRAN, BASIC, COBOL, TEACH, SOLVE, DAP, Text Editor	–	FORTRAN, BASIC, COBOL, APL, ALGOL, LISP, SNOBOL, AID, etc.
Batch-mode programming languages	FORTRAN, BASIC, COBOL, APL, ALGOL, Macro-10, etc.	FORTRAN, BASIC, COBOL, Manage, Metasymbol		None required by user	FORTRAN, BASIC, COBOL, APL, ALGOL, LISP, SNOBOL, etc.
Principal applications	Business & scientific	Business & scientific	Business & scientific	Business	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	$5.00	$100	$25	–	None
Remote batch	$5.00	None	–	See Comments	None
Terminal connect time:					
Interactive	$7.50-12.00/hr.	$9.00-14.50/hr.	$6.00/hr.	–	$7.50/hr.
Remote batch	None	Not applicable	–	See Comments	$7.50/hr.
Central processor time:					
Interactive	See Comments	$0.08/Unit	None	–	$3.00-18.00/min.
Remote batch	See Comments	$0.08/Unit	–	See Comments	$1.50-9.00/min.
Mass storage:					
Interactive	$0.01/640 chars./day	$0.50/2048 Chars./month	$0.50/512 chars./month	–	$0.50/1000 chars./month
Remote batch	$0.01/640 chars./day	$0.50/2048 chars./month	–	See Comments	$0 50/1000 chars./month
COMMENTS	CPU charges vary with amount of main storage used. Rates are much lower during non-prime hours.	"Virtual port" contracts available. Offers discounts for volume usage and non-prime time.	Offers special rates for large data bases and dedicated ports. Offers tax return preparation service.	Specializes in remote batch services for accountants. Charges are based on number of transactions processed and frequency.	CPU charges vary with amount of main storage used. Offers discounts for large-volume mass storage and non-prime time.

All About Remote Computing Services

COMPANY	First National Bank of Memphis	Fulton National Bank	General Electric Company	Genesee Computer Center, Inc.	Grumman Data Systems Corporation
GENERAL					
Name of service	Compu-Serv	Fulton Data	Mark III	Genesee Services	Calldata
Date operational	March 1969	1966	1965	Aug. 1968	Feb. 1970
Areas currently served	Memphis area plus 23 other cities nationwide	Southeastern U.S. via multiplexers in major cities and INWATS service	Local-call service to more than 300 cities in North America, and (via satellite) Western Europe, Australia, and Japan	Continental U.S. and Toronto via multiplexers and INWATS service	Middle Atlantic and New England; INWATS service to Conn., Del., Mass., N.H., N.J., Pa. R.I., & Vt.
EQUIPMENT					
Computers	DECsystem 1050 (4) in Columbus, Ohio	Honeywell 6050 (2) and Honeywell 440 in Atlanta	More than 100 computers, including Honeywell 635 and 6000 systems, in one "supercenter" in Cleveland	CDC 6600, 6400, and 3500 systems belonging to Control Data (Cybernet) and Multiple Access Ltd.	IBM 360/67 in Bethpage, N.Y.
No. of simultaneous users	400 total	125 total	Up to 100 per computer	Not specified	96
Conversational terminals supported	Any ASCII, BCD, Correspondence, or EBCDIC terminal at 10, 14.8, 15, or 30 cps	TTY and all compatible units at 10 to 30 cps	ASCII, EBCDIC, or Correspondence terminals at 10, 14.8, 15, or 30 cps	TTY and all compatible units at 10 or 30 cps	TTY 33/35, IBM 2741, and compatible units
Batch terminals supported	DEC PDP-8 and PDP-11 computers in some cities	"All"	IBM 2780, Data 100, Remcom 2780, MDS 2400, and Honeywell G-115	CDC 200, DEC PDP-11, IBM 1130, UNIVAC 9200/9300, Data 100, etc.	IBM 2780, 1130, 360/20, and compatible units
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC, COBOL, ALGOL, SNOBOL, LISP, Macro 10	FORTRAN, BASIC	FORTRAN, BASIC, ALGOL, Editors, DATOOL	FORTRAN, COBOL, Compass	BASIC, BRUIN, SNOBOL, SCRIPT, EDIT
Batch-mode programming languages	FORTRAN, BASIC, COBOL, ALGOL, SNOBOL, LISP, Macro 10	COBOL, ALGOL, JOVIAL, Simscript, Databasic	FORTRAN, COBOL	FORTRAN, COBOL, Compass	FORTRAN, COBOL, PL/1, Assembler, GPSS
Principal applications	Business & scientific	Business & scientific	Business & scientific	Business & scientific	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	None	None	$100/catalog	None	None
Remote batch	None	None	$300/catalog	None	None
Terminal connect time:					
Interactive	$9-13/hr.	$7/hr. (300 bps)	$7-13.50/hr.	$8-15/hr.	$7.50-12.50/hr.
Remote batch	Not specified	$15/hr. (2000 bps)	$7-16/hr.	$10-20/hr.	$7.50-12.50/hr.
Central processor time:					
Interactive	$1.20/min.	$0.03/unit	$0.33-0.40/CRU	$0.18-0.20/sec.	$0.35/sec.
Remote batch	$1.20/min.	$8.33/min.	$0.07/BCRU	$0.20-0.60/sec.	$5.60-11.20/min.
Mass storage:					
Interactive	$1.50/3200 chars./month	$1.00/1280 chars./month	$0.20-1.10/320 36-bit words/mo.	$0.01/1280 chars./day	$3.75-12.50/ cylinder/month
Remote batch	$1.50/3200 chars./month	$1.00/1280 chars./month	$0.20/320 36-bit words/mo.	$0.01/1280 chars./day	$3.75-12.50/ cylinder/month
COMMENTS	Marketing affiliate of Compu-Serv Network, Inc., of Columbus.		Offers extensive data management facilities. CPU charges depend on resources required and other factors. Discount for deferred processing.	Provides specialized technical services, and resells Control Data or Multiple Access computer services, at the supplier's rates, in the process.	Deferred processing option allows TS jobs to be set up during prime time and processed overnight at reduced rates ($0.20/CPU second).

All About Remote Computing Services

COMPANY	GTE Data Services Incorporated	HDR Systems, Inc.	Honeywell Information Systems, Inc.	Information Systems Design	Interactive Data Corporation
GENERAL					
Name of service	GTEDS Time-Sharing Service	HDR Systems KRONOS	Datanetwork	–	–
Date operational	Nov. 1971	Oct. 1972	July 1972	June 1968	1968
Areas currently served	Continental U.S. plus Hawaii and Alaska	Omaha and surrounding area	Entire U.S.; local service in most large cities plus INWATS service	Western States	Entire U.S. via INWATS and foreign exchange lines
EQUIPMENT					
Computers	CDC 6500, CDC 6600, and CDC Cyber 73-28 (2)	CDC 6400 in Omaha, Neb.	Honeywell 6080 (2) in Minneapolis	UNIVAC 1108 (2) in Oakland, Calif.	IBM 360/67 (2) in Waltham, Mass.; IBM 360/67 in San Francisco; IBM 360/40 in New York City
No. of simultaneous users	1000 total	150	130	63	120 total
Conversational terminals supported	"Any"	TTY 33/35, CDC 713, Execuport, etc.	TTY and compatible units at 10, 15, or 30 cps; Honeywell VIP displays; IBM 2741	TTY and compatible units at 10, 30, or 120 cps	TTY 33/35, IBM 2741, and compatible units at 10 to 30 cps
Batch terminals supported	CDC 200 User Terminal and all compatible units	CDC 200 & 731, Data 100, M&M 500, Mohawk 2400, etc.	Honeywell G100 G200, G400, H200/ 2000 Series, H58, Mohawk 2400, etc.	UNIVAC 1004, COPE, Data 100, IBM 1130, M&M, etc.	IBM 2780 and compatible units
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC	FORTRAN, BASIC, COBOL, APL, Text Editor	FORTRAN, BASIC, Text Editor	FORTRAN, BASIC, Text Editor	FORTRAN, BASIC, COBOL, PL/1, Assembler
Batch-mode programming languages	FORTRAN, BASIC, COBOL, Simscript, Compass	FORTRAN, COBOL, Compass	FORTRAN, COBOL, ALGOL, JOVIAL GMAP, COBOL/IDS	FORTRAN, COBOL, ALGOL	FORTRAN, BASIC, COBOL, PL/1, Assembler
Principal applications	Business & scientific	Business & scientific	Business & scientific	Business & scientific	Business & scientific
CHARGES					
Min. Monthly charge:					
Interactive	None	None	$90	$30	None
Remote batch	None	None	$90	$30	None
Terminal connect time:					
Interactive	$10.50-16.50/hr.	$4/hr. (10/30 cps)	$10/hr. (10-30 cps)	$4-7/hr.	$10/hr.
Remote batch	$13.50/hr.	$10/hr. (2000 bps)	$30/hr. (2000 bps)	$10/hr.	None
Central processor time:					
Interactive	$1.20-19.80/min.	$0.20/sec.	$1.00/TSU	$10-16/min.	$16.80/min.
Remote batch	$7.05/min.	$0.20/sec.	$1.00/RBU	$10-16/min.	$16.80/min
Mass storage:					
Interactive	$0.50/1280 chars./month	$0.20/640 chars./month	$0.15-0.65/320 36-bit words/mo.	$9.00/85,000 chars./month	$1.00/6000 chars./month
Remote batch	$0.50/1280 chars./month	$0.20/640 chars./month	$0.15-0.65/320 36-bit words/mo.	$9.00/85,000 chars./month	$1.00/6000 chars./month
COMMENTS	Offers general time-sharing services plus large library of applications programs for telephone companies.	Offers powerful text editing system and professional consulting services.	Offers 160 hours/ week nationwide access to GCOS multidimensional computing, plus 24-hour customer service hotline.	Specializes in high-speed remote job entry at up to 1000 cpm and 1200 lpm. Rates are lower during non-prime hours.	Offers on-line financial data bases with proprietary software for accessing and processing the data.

All About Remote Computing Services

COMPANY	Interactive Sciences Corporation	International Timesharing Corporation	ISC/Pryor Computer	Kaman Aerospace Corporation	Keydata Canada
GENERAL					
Name of service	ISC Time-Sharing	3300 Network & 1640 Network	ISC/Pryor	Kaman TS Systems	Keydata
Date operational	1968	May 1968	June 1969	Aug. 1971	1969
Areas currently served	New England, Middle Atlantic, & East Central States; lines to New York, Phila., Detroit, & 6 other cities	Atlanta, Boston, Chicago, Cleveland Dallas, Denver, Detroit, Houston, Los Angeles, Phila., & 10 other cities	Illinois and Ontario	Central Connecticut	Major Canadian metropolitan areas; current subscribers in Toronto, Montreal, and Vancouver
EQUIPMENT					
Computers	DEC PDP-10 (2) in Braintree, Mass.	CDC 3300 (2) & Honeywell 1648A (4) in Chaska, Minn.	Honeywell 440 in Toronto, Ont.	HP 2000C in Bloomfield, Conn.	UNIVAC 494 (2) in Watertown, Mass.
No. of simultaneous users	128 total	194 total	50	32	2000 total
Conversational terminals supported	TTY and compatible units at 10 or 30 cps; IBM 2741 and campatible units at 14.8 cps	TTY 33/35, IBM 2741, and compatible units, including displays	TTY 33/35, GE TermiNet 300, Memorex 1240, UNIVAC DCT 500, Olivetti	Any ASCII terminal at 10, 15, or 30 cps	TTY Model 28, GE TermiNet
Batch terminals supported	—	—	—	—	—
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC, COBOL, ALGOL, LISP, Macro 10	FORTRAN, BASIC, BPL, IMS, Assembly, TEACH, SOLVE, EDIT, etc.	FORTRAN, BASIC	BASIC	Not specified
Batch-mode programming languages	—	—	—	—	—
Principal applications	Business & scientific	Business & scientific	Business & scientific	Business & scientific	Business
CHARGES					
Min. monthly charge:					
Interactive	None	$200	$50	None	$800
Remote batch	—	—	$500	—	—
Terminal connect time:					
Interactive	$9/hr.	$10/hr.	$10/hr.	$5.50-8.00/hr.	See Comments
Remote batch	—	—	—		—
Central processor time:					
Interactive	$0.01/CRU	$0.12/CRU	Not specified	No charge	See Comments
Remote batch	—	—	—	—	
Mass storage:					
Interactive	$0.01/640 chars./day	$0.15-0.60/640 chars./month	$0.75/1000 chars./month	$0.16-0.30/1000 bytes/month	See Comments
Remote batch	—	—	—	—	—
COMMENTS	Offers business planning service, professional services, 30-inch plotter, and lower rates for non-prime time.	Charges shown are for 3300 Network; 1640 Network was acquired from Honeywell in April 1973. Business Planning Language aids in financial planning.	Specializes in remote processing of billing, accounts receivable, sales analysis, and inventory control.	Offers dedicated port (i.e., unlimited access) for $500 (local to Hartford) or $825 (statewide access) per month.	All charges are based on number of transactions processed. Dedicated system for business data processing applications.

All About Remote Computing Services

COMPANY	Keydata Corporation	Leasco Response, Inc.	Management Systems Corporation	Manufacturing Data Systems, Inc.	Mark/Ops
GENERAL					
Name of service	Keydata	Response/360, Response I	Time Sharing Services	Compact II N/C Parts Programming	Mark/Ops
Date operational	1965	1969	April 1970	March 1969	April 1967
Areas currently served	Continental U.S. & Eastern Canada; 23 concentrators	Eastern and Midwestern U.S. plus Los Angeles;	Salt Lake City, Provo, and Ogden, Utah	All of U.S. and Canada, United Kingdom, & France	New England States and New York City area
EQUIPMENT					
Computers	UNIVAC 494 (2) in Watertown, Mass.	IBM 360/65 in Maryland; HP HP 2116 in each branch office	IBM 370/145 & IBM 360/65 in Salt Lake City	Xerox 940 systems in Ann Arbor (Com-Share) and Palo Alto (Tymshare)	DEC PDP-10 in Boston
No. of simultaneous users	2000 total	Not specified	44 total	Not specified	64
Conversational terminals supported	"Almost all" (e.g., TTY Model 28, GE TermiNet, TI Silent 700, Computer Devices)	TTY 33/35 & other ASCII terminals at 10 to 30 cps; IBM 2741	Trendata 1000, Trendata 1500, IBM 2741	TTY ASR 33, Western Union DT300, GE TermiNet	All ASCII units at 10, 15, or 30 cps; IBM 2741 and compatible units
Batch terminals supported	—	—	—	—	—
SOFTWARE					
Conversational programming languages	Keydata On-Line Processing Language (KOP)	BASIC, FORTRAN, PL/1	APL	Compact II	FORTRAN, BASIC, COBOL, Macro 10
Batch-mode programming languages	Keydata Report Generator (KRG)	Full OS/360 capabilities	—	—	FORTRAN, BASIC, COBOL
Principal applications	Business	Business & scientific	Business & scientific	Numerical control	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	See Comments	$100	None	$50	None
Remote batch	—	—	—	—	None
Terminal connect time:					
Interactive	See Comments	$9.40-13.75/hr.	$3.75/hr. (local)	$10-14/hr.	$8/hr.
Remote batch	—	—	—	—	$8/hr.
Central processor time:					
Interactive	See Comments	$18.60/min.	$0.11/sec.	$35/min.	$0.10/sec. (4K)
Remote batch	—	—	—	—	$0.05/sec. (4K)
Mass storage:					
Interactive	See Comments	$1.05/3440 chars./month	$1.00/7294 chars./month	$1.00/1000 chars./month	$0.01/640 chars./day
Remote batch	—	—	—	—	$0.01/640 chars./day
COMMENTS	Dedicated system for business data processing applications. All charges are based upon application volume and customer usage.	Charges shown are for Response/360 service on IBM 360/65. Response I service on HP costs $6-8/hr. of connect time (no CPU charge).	Offers Text Processing System (TPS) to facilitate preparation of publications, proposals, etc.	Offers numerical control parts processing system, using Com-Share and Tymshare computers and communications networks.	Division of Northeastern Systems Associates. Specializes in large systems for specific customers. Lower rates for non-prime time.

All About Remote Computing Services

COMPANY	McDonnell Douglas Automation Co.	Merlin Systems Corporation	Metridata Computing, Inc.	Multiple Access Limited	National CSS, Inc.
GENERAL					
Name of service	Direct Access Computing (DAC)	Merlin Systems	Metrinet	–	VP/CSS
Date operational	Jan. 1968	Jan. 1970	Jan. 1969	Oct. 1969	Dec. 1968
Areas currently served	Continental U.S. plus Montreal, Toronto, Windsor, and Vancouver, Canada	Continental U.S.; toll-free access from all zones	Multiplexers in Chicago, Cincinnati, Dayton, and Indianapolis; foreign exchange in Columbus, O.	All of Canada & Northeastern U.S.	East Coast, Midwest, West Coast, Arizona, Houston, Canada, London
EQUIPMENT					
Computers	IBM 370/195 (2) in St. Louis; IBM 370/165 (2) in Long Beach; Xerox Sigma 9 (2) in St. Louis; etc.	Burroughs B 5500 (2) in Roslyn, N.Y.	Honeywell 430 (2) in Louisville	CDC 3500 and CDC 6600 in Toronto	IBM 360/67 (6) & 370/145 in Stamford, Conn.; IBM 360/67 (2) in Sunnyvale, Calif.
No. of simultaneous users	128 (time-sharing); 56 (RJE)	50	80 total	48 on CDC 3500, 32 on CDC 6600	500 in Conn. & 160 in Calif.
Conversational terminals supported	All ASCII units at 10 or 30 cps; IBM 2741 and compatible units; Computek & Tektronix graphics	Any ASCII terminal at 10 or 30 cps, including Hazeltine & ARDS graphic terminals	Any ASCII terminal at 10 or 30 cps	TTY and all compatible units at 10 or 30 cps	TTY and all compatible units at 10, 15, 30, 60, or 120 cps
Batch terminals supported	IBM 2770, 2780, 3780, 1130, 360/20, System/3, and compatible units	–	–	IBM 360/20 & 1130, UNIVAC 9200/9300, CDC 200, Harris COPE .38, etc.	1200-bps dial-up terminals
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC, COBOL, SYMBOL	FORTRAN, BASIC, COBOL, ALGOL	FORTRAN, BASIC	FORTRAN, BASIC, COBOL, Compass	FORTRAN, BASIC, COBOL, PL/1, Assembler
Batch-mode programming languages	FORTRAN, COBOL, PL/1, RPG, Assembler, IMS/DL-1, etc.	FORTRAN, BASIC, COBOL, ALGOL	COBOL	FORTRAN, BASIC, COBOL, Compass	FORTRAN, BASIC, COBOL, PL/1, Assembler
Principal applications	Business & scientific	Financial & statistical	Business & scientific	Business & scientific	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	None	None	None	None	None
Remote batch	None	On request	–	None	None
Terminal connect time:					
Interactive	$8/hr.	$9/hr.	$10/hr.	$3.75-12.00/hr.	$10-20/hr.
Remote batch	Varies with speed	On request	–	$20.00/hr.	None
Central processor time:					
Interactive	$12/min. on Sigma	$7.20/min.	$0.04/CPU unit	$0.16/sec. (3500)	$0.19/VPV
Remote batch	$13/min. on 165; $42/min. on 195	On request	–	$0.23-0.50/sec. (6600)	$0.08-0.12/VPU
Mass storage:					
Interactive	$0.10/1024 bytes/week	$0.15-0.50/1000 chars./month	$0.75-1.75/1000 chars./month	$0.35/1280 chars./month	$20/120,000 bytes/month
Remote batch	$0.035-0.04/1024 bytes/week	–	–	$7.00/32,000 chars./month	$20/120,000 bytes/month
COMMENTS	Offers time-sharing on Sigma 9's, RJE on 370's, and full range of graphics services. High-speed links interconnect the computers.	Offers on-line financial data bases of securities, bonds, options, and commodities prices.		High-speed link between CDC 3500 and 6600 gives all users on-line access to both systems. Offers financial planning packages.	

All About Remote Computing Services

COMPANY	Ohio Valley Data Control, Inc.	On-Line Business Systems, Inc.	On-Line Systems, Inc.	Pacific Applied Systems, Inc.	Pacific International Computing Corp.
GENERAL					
Name of service	–	–	–	TASC system	ATS, COMSPEC, Honeywell TSS
Date operational	July 1972	July 1971	Dec. 1967	1971	Nov. 1969
Areas currently served	Ohio Valley – Eastern Ohio and West Virginia	West Coast, Nevada, Arizona	Northeastern, Middle Atlantic, Midwestern, and Southern U.S.; toll-free access from 16 cities	Continental U.S.	Los Angeles, Palo Alto, San Francisco, Ann Arbor, Boston, Chicago, Dayton, New York, Phila., Richmond, Washington, D.C.
EQUIPMENT					
Computers	Burroughs B 3500 (2) in Belpre, Ohio	IBM 370/145 in San Francisco	DEC PDP-10 (7) in Pittsburgh	GRI 99 in Sherman Oaks, Calif.	IBM 360/50 in New York; Honeywell 6080 in San Francisco
No. of simultaneous users	Over 100	100	448	6	212 in New York, 35 in San Fran.
Conversational terminals supported	Burroughs TD 700 and TD 500	All IBM-compatible terminals (e.g., 2260, 2740, 3270)	TTY 33/35/37, IBM 2741, and compatible units, including plotters and CRT displays	–	Correspondence, ASCII, EBCDIC, and BCD units at 10, 15, or 30 cps
Batch terminals supported	Burroughs B 345	All IBM-compatible terminals	Data 100, etc.	UNIVAC 1004, Harris COPE, etc. (tie into UNIVAC 1108 computer)	Honeywell 105 and 115
SOFTWARE					
Conversational programming languages	FORTRAN, COBOL	None	FORTRAN, BASIC, COBOL, APL, Telcomp	Test Oriented Language	FORTRAN, BASIC
Batch-mode programming languages	Assembler	None	FORTRAN, BASIC, COBOL, APL, Telcomp	Test Oriented Language	FORTRAN, COBOL, GMAP
Principal applications	Business, banking, cash dispensing	Specialized business systems	Business & scientific	Terminal access simulation	Construction & text editing
CHARGES					
Min. Monthly charge:					
Interactive	Not specified	None	$5/user no.	–	Not specified
Remote batch	Not specified	None	$5/user no.	$3,000 (2-year lease)	Not specified
Terminal connect time:					
Interactive	$10/hr.	See Comments	$10/hr.	–	$2.50/hr.
Remote batch	$30-48/hr.	$30/hr.	None	Not applicable	–
Central processor time:					
Interactive	Varies with application	Not applicable	$0.05/CP unit	–	$0.01/unit
Remote batch		$4/min.	$0.05/CP unit	Not applicable	–
Mass storage:					
Interactive	$20/100,000 bytes/month	$0.05/1000 bytes/month	$0.05/3200 chars./day	–	$0.24/PSR
Remote batch	$20/100,000 bytes/month	$0.02/1000 bytes/month	$0.05/3200 chars./day	Not applicable	–
COMMENTS	Specializes in banking services. Offers time-sharing, remote batch processing, and "Mister Cash" on-line cash dispensing service.	Limited to applications such as reservations, order entry, POS, inventory, data base retrieval, etc. Billing is on a transaction basis.	Service available 24 hours/day, 7 days/week. Offers on-line data management, financial modeling, & resource management systems.	Dedicated system tests simulation models for program development for automatic test equipment (ATE). Uses UNIVAC 1108 at service bureau.	Specializes in COMSPEC service for construction industry and ATS text editing system.

All About Remote Computing Services

COMPANY	Paden Data Systems, Inc.	Philco-Ford Computer Services Network	Phoenix Data Limited	PRC Computer Center, Inc.	Profile Technology, Inc.
GENERAL					
Name of service	Paden Data Base (PDB)	Computer Services Network (CSN)	KRONOS	–	The Computer Spectrum
Date operational	Summer 1973	Dec. 1968	July 1972	1970	1972
Areas currently served	Dallas-Fort Worth metropolitan area	Middle Atlantic States, Chicago, Detroit	Alberta, Manitoba, Ontario, Saskatchewan	Continental U.S.	Southeastern U.S.
EQUIPMENT					
Computers	Burroughs B 3500 in Dallas	Burroughs B 5700 (2) and B 6700 in Fort Washington, Pa.	CDC 6500 and CDC 1700 in Winnipeg	IBM 370/155 in McLean, Va.	HP 2000F in Chattanooga, Tenn.
No. of simultaneous users	15	168 total	512 timesharing, 46 remote batch	96	32
Conversational terminals supported	Burroughs TC 500 and TD 700	ASCII terminals at 10 or 30 cps	TTY 33/35 and compatible units	–	TTY and other ASCII terminals
Batch terminals supported	–	Burroughs DC 1000, IBM 2780, and compatible units	CDC 200 & 731, IBM 360/20, Comterm, Mohawk, Remcom	IBM 2780 & 360/20, Data 100, Harris COPE, etc.	NCR printers & card readers, etc.
SOFTWARE					
Conversational programming languages	None	FORTRAN, BASIC, COBOL, ALGOL	FORTRAN, BASIC, APL, Text Editor	–	FORTRAN, BASIC
Batch-mode programming languages	None	FORTRAN, BASIC, COBOL, ALGOL	FORTRAN, COBOL, Compass, Spectre	FORTRAN, COBOL, ALGOL, PL/1, Assembler	FORTRAN, Assembly
Principal applications	Business	Business & scientific	Business & scientific	Business & scientific	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	$750	None	None	–	$70
Remote batch	–	None	None	None	–
Terminal connect time:					
Interactive	See Comments	$9/hr. (to 30 cps)	$5/hr.	–	$7/hr.
Remote batch	–	$25/hr. (over 30 cps)	$7/hr.	None	–
Central processor time:					
Interactive	See Comments	$7.20/min.	$12.00/min.	–	No charge
Remote batch	–	$14.40/min.	$5.40-12.00/min.	$12.00/min.	–
Mass storage:					
Interactive	$0.0375/200 bytes/month	$1.00/1000 chars./month	$0.28/1280 chars./month	–	$1.00/3000 chars./month
Remote batch	–	$0.50/1000 chars./month	$0.28/1280 chars./month	Not specified	–
COMMENTS	Offers integrated business data processing service. Charges $0.125 per input transaction plus telephone line costs.	Bulk storage and dedicated lines are available at large discounts. Interactive rates shown are for B 5700, remote batch for B 6700.		Offers OS/370 remote job entry service. Additional charges for core usage, disk & tape mounts, and I/O device usage.	

All About Remote Computing Services

COMPANY	Programs & Analysis, Inc.	Proprietary Computer Systems, Inc.	Rapidata, Inc.	Remote Computing Corporation	SBC Data Services
GENERAL					
Name of service	Thrift Line Service	PCS/APL, PCS/RJE, Advanced ATS	Rapidnet	RCC Network	RTS, TSO, RJE, CRJE
Date operational	1969	Oct. 1968	Jan. 1968	Oct. 1968	March 1968
Areas currently served	New England and Middle Atlantic States plus Cincinnati	California, Mountain States, & Midwest; multiplexers in San Francisco, Palo Alto, San Diego, Santa Ana, Denver, & Chicago	Continental U.S. via INWATS and foreign exchanges; offices in New York Atlanta, Boston, L.A., & other cities	Local coverage throughout Calif.; nationwide tollfree INWATS service	Continental U.S.
EQUIPMENT					
Computers	Honeywell 6050 and 435 in Burlington, Mass.	IBM 360/65 in Van Nuys, Calif.	Honeywell 437 (12), DECsystem-1070, and IBM 370/145 in Fairfield, N.J.	Burroughs B 5700 (3) and B 6700 in Palo Alto; Burroughs B 5700 (2) in Los Angeles	IBM 360/65, 370/155, 360/40, and 360/30 in Paramus, N.J.
No. of simultaneous users	64 total	120	55 per H 437	32 per system	100 total
Conversational terminals supported	TTY and compatible units	ASCII terminals at 10 to 30 cps; IBM 2741 and compatible units; IBM & Hazeltine CRT displays	TTY and compatible units at 10, 15, 30, 60 or 120 cps; IBM 2741 and compatible units at 14.8 cps	TTY 33/35/37, IBM 2741, and compatible units at 10 to 120 cps	TTY 33/35/37/38, IBM 2740 & 2741, and compatible units
Batch terminals supported	Data 100, Harris COPE, Mohawk, Remcom	IBM 2780, 3780, and compatible units	IBM 2780, Data 100, and compatible units	—	Various IBM and compatible units
SOFTWARE					
Conversational programming languages	FORTRAN, BASIC	APL	FORTRAN, BASIC, COBOL, RIPS	FORTRAN, BASIC, COBOL, ALGOL	FORTRAN, BASIC, COBOL, PL/1, Assembler
Batch-mode programming languages	FORTRAN, COBOL	FORTRAN, COBOL, PL/1, LISP, GPSS	FORTRAN, COBOL	FORTRAN, BASIC, COBOL, ALGOL	FORTRAN, COBOL, PL/1, Assembler
Principal applications	Business	Business & scientific	Business & scientific	Business & scientific	Business & scientific
CHARGES					
Min. monthly charge:					
Interactive	See Comments	None	$10	None	None
Remote batch	—	None	$10	—	None
Terminal connect time					
Interactive	See Comments	$3.25-9.00/hr.	$5-25/hr.	$7/hr. and up	$10/hr.
Remote batch	—	$8.00-9.00/hr.	$30/hr.	—	Not specified
Central processor time:					
Interactive	See Comments	$18.00/min.	$1.44-3.60/min.	$7.20/min.	$0.03/CWU
Remote batch	—	$3.83-12.46/min.	$1.44-3.60/min.	—	Not specified
Mass storage:					
Interactive	See Comments	$10.00/million bytes/day	$0.20-0.60/1000 char./month	$0.01-0.24/2400 chars./day	$0.01/Storage Unit/day
Remote batch	—	Depends on EXCP's	$0.20-0.60/1000 chars./month	—	Not specified
COMMENTS	Offers dedicated business data processing services. Each application is charged on a unit transaction basis.	PCS services are available on the East Coast through affiliation with The Computer Company, of Richmond.	Offers several financial data bases: stock markets, economics, etc.	Connect charge ranges from $7/hr. at 110 bps to $25/hr. at 1200 bps. Rates are 40% lower after 5 p.m. PST.	A division of The Service Bureau Corp. (formerly ITT Data Services).

All About Remote Computing Services

COMPANY	Scientific Process & Research, Inc.	Scientific Time Sharing Corporation	Sci-Tek Incorporated	The Service Bureau Corporation	I.P. Sharp Associates Limited
GENERAL					
Name of service	SPR	APL*Plus	Sci-Tek	CALL/370 Management Time Sharing	Sharp APL
Date operational	1969	Aug. 1969	Jan. 1967	1964 (QUIKTRAN)	1969
Areas currently served	Continental U.S.	Local access in 36 cities throughout the U.S. plus Toronto and London	Eastern Seaboard	New England, Middle Atlantic States, Midwest, Mountain States, Texas, West Coast, Toronto, & Montreal	Contintal U.S., Canada, and United Kingdom
EQUIPMENT					
Computers	DEC PDP-10 (2) in Princeton, N.J.	IBM 370/155 in Bethesda, Md.	UNIVAC 1108 (2) In Wilmington, Del.	IBM 370/155 (5) in Cleveland	IBM 370/145 (2) in Toronto
No . of simultaneous users	60	Over 100	96 total	Over 150/system	150
Conversational terminals supported	TTY 33/35 and other ASCII terminals at 10 or 30 cps	IBM 2741, AJ 841, GTE Novar, Ontel, Computer Devices, Delta Data, Hazeltine 2000, Tektronix, etc.	TTY 33/35, Tektronix 4010	IBM 2741, TTY 33/35, and 30 cps ASCII terminals	IBM 2741 and compatible Correspondence, EBCDIC, or ASCII units, including Tektronix
Batch terminals supported	—	IBM 2780, Harris COPE, etc.	UNIVAC 1004, 9200, & 9300; IBM 2780 & 1130; Harris 1200	IBM 2780 or equivalent	—
SOFTWARE					
Conversational programming languages	FORTRAN BASIC, COBOL, Macro-10, etc.	APL*Plus	BASIC, RALPH	FORTRAN, BASIC, PL/1, Data Management	APL
Batch-mode programming languages	—	—	FORTRAN, COBOL, SLEUTH	FORTRAN, BASIC, PL/1, Data Management	All System/370 languages
Principal applications	Engineering & simulation	Business & scientific	Business & scientific	Business & scientific	Business & Scientific
CHARGES					
Min. monthly charge:					
Interactive	None	None	None	$100	None
Remote batch	—	—	None	—	—
Terminal connect time:					
Interactive	$10/hr.	$12/hr.	$10/hr.	$11-15/hr.	$12/hr.
Remote batch	—	$50/hr.	None	—	—
Central processor time:					
Interactive	$2.25-22.50/min.	$24/min.	$30/min.	$0.15/PU	$18/min.
Remote batch	—	—	$12-30/min. based on priority	$0.06-0.12/PU	—
Mass storage:					
Interactive	$0.015/1000 chars./day	$0.30/1000 chars./month	$1.20/10,752 chars./month	$0.44/1000 bytes/month	$0.15-0.24/1000 chars./month
Remote batch	—	—	$1.20/10,752 chars./month	$0.18-0.30/1000 bytes/month	—
COMMENTS	Offers simulators for plastics processing and optimization package.	APL*Plus File Subsystem facilitates processing of large shared files and data bases.	Offers APT, file management system, graphics systems, and Securities Validation System.	Subsidiary of Control Data Corp. since January 1973. Offers conversational time-sharing, remote batch, and local batch service. Wide range of pricing plans.	Company also offers systems consulting services and makes portable computer terminals.

All About Remote Computing Services

COMPANY	The Singer Company	Statistical Tabulating Corporation	Structural Dynamics Research Corp.	Systems Dimensions Limited	Technical Advisors, Inc.
GENERAL					
Name of service	Singer Information Systems Network	STAT:COM	SDRC Computer Operations	STS/WYLBUR, STS/INFO, etc.	TECH-MAC
Date operational	1970	Spring 1972	Jan. 1969	June 1969	June 1967
Areas currently served	United States and Europe	Continental U.S.	Nationwide access	Batch services throughout North America; toll-free 300 bps dial-up service in Toronto, Montreal, Ottawa, New York, & Boston	Continental U.S. except Alaska (toll-free except in Michigan)
EQUIPMENT					
Computers	IBM 370/165 & 370/168 in Wayne, N.J.; IBM 370/155 in Sunnyvale, Cal.; four IBM 370's in Europe	IBM 360/65 & 370/158 in Chicago	CDC 6500 in Pittsburgh; CDC 6600 in Minneapolis; Xerox 940 in Ann Arbor; Honeywell 635 in Cleveland, etc.	IBM 360/85 in Ottawa	Varian 622i (2); 1 in Wayne, Mich., and 1 in Phoenix, Ariz.
No. of simultaneous users	128 in N.J. & 64 in Cal.	99	Varies with system	100	20 in Wayne, 5 in Phoenix
Conversational terminals supported	TTY, IBM 2741, and all compatible units	TTY 33/35/38, IBM 2740/2741, Memorex 1240/1250, Hazeltine 2000, Datapoint 3300, etc.	TTY 33/35 and other ASCII terminals at 10 or 30 cps	IBM 2741 and compatible units; TTY and compatible ASCII terminals	TTY 33/35 or equivalent, including CRT displays
Batch terminals supported	Singer System Ten, 1500, or M&M 500; IBM 2780, 360/20 or any HASP-compatible terminal	IBM 2780, 3780, 2770, 2790, and System/3; Data 100, Badger DTS 100, Mohawk 2400, etc.	CDC 200 & 1700, IBM 1130, Data 100, Mohawk 2400, UNIVAC 9200, etc.	IBM BSC terminals and equivalents	—
SOFTWARE					
Conversational programming languages	WYLBUR, ATS	Hyperfaster/II	FORTRAN, BASIC	—	—
Batch-mode programming languages	All OS/360 languages, Mark IV, WATFOR	FORTRAN, COBOL, PL/1, ADPAC, RPG, Assembly	FORTRAN, BASIC, COBOL, ALGOL, Assembly	FORTRAN, COBOL, PL/1, RPG, Assembler, Mark IV	—
Principal applications	Business & scientific	Business & scientfic	Engineering & business	Business & scientific	Civil engineering & surveying
CHARGES					
Min. monthly charge:					
Interactive	None	None	None	None	None
Remote batch	None	None	None	None	—
Terminal connect time:					
Interactive	$3/hr.	$10/hr.	$9.50-13.00/hr.	$12/hr.	$10-28/hr.
Remote batch	$10/hr.	$10/hr.	Varies with system	Based on resource usage	—
Central processor time:					
Interactive	$9/min.	See Comments	$1.80-24.00/min.	$1200/task hour	None
Remote batch	By algorithm	See Comments	Varies with system	$1200/task hour	—
Mass Storage:					
Interactive	$4.05x10^{-7}/track/second (3330)	$0.25/7294 bytes/week	$0.10-1.75/1000 chars./month	$2.00/million bytes/day	$10.00/2000 chars./month
Remote batch	By algorithm	$0.25/7294 bytes/week	Varies with system	$2.00/million bytes/day	—
COMMENTS		Charges $8/1000 cards read and $4/1000 lines printed. Express processing is available at higher CPU charges.	Sells time on U.S. Steel, CDC, ACTS, GE, Com-Share, & Metridata systems. Features mechanical design and structural analysis programs.	Offers System/360 remote job entry services under OS/MVT, plus an interactive file editor (WYLBUR) and data retrieval system (INFO).	Offers specialized service for civil engineers and surveyors only. Plotter available for $45/hour.

All About Remote Computing Services

COMPANY	Technology for Information Management, Inc.	Tel-A-Data, Inc.	Telstat Systems, Inc.	Texas Instruments Incorporated
GENERAL				
Name of Service	TIM-Sharing	Tel-A-Data	TELAC/70	Texas Instruments Information Services
Date operational	Sept. 1968	Dec. 1966	Jan. 1971	1970
Areas currently served	New York State	State of Florida	New York City metropolitan area.	United States, Canada, and Western Europe
EQUIPMENT				
Computers	Honeywell 440 in Detroit, operated by ACTS Computing Corp.	Burroughs B 500	Xerox Sigma 7	IBM 370/195, 165, 158, & 155 in Dallas; IBM 370/168, 360/65, & 360/50 in London
No. of simultaneous users	50	64	64	33 in Dallas, 7 in London
Conversational terminals supported	TTY 33/35 and other ASCII terminals at 10 or 30 cps	TTY 33/35, GE TermiNet 300, Burroughs TC 500	TTY 33/35, IBM 2741, GE TermiNe t 300, Datapoint 3300, Execuport, etc.	TI Silent 700; IBM 1050, 2260, and 3270
Batch terminals supported	—	—	XDS 7670, IBM 1130, UNIVAC DCT 2000	IBM 360/20, 1130, and 2922; Data 100
SOFTWARE				
Conversational programming languages	FORTRAN, BASIC	Assembler, COBOL	FORTRAN, BASIC, Symbol, ASSIST	DL/1, ITS, CRJE
Batch-mode programming languages	—	—	FORTRAN, COBOL, BASIC, Symbol, Metasymbol	FORTRAN, COBOL, BASIC, PL/1, Assembler
Principal applications	Business & scientific	Business	Financial services	Business & scientific
CHARGES				
Min. monthly charge:				
Interactive	$25	$800	None	Not specified
Remote batch	—	—	Not specified	Not specified
Terminal connect time:				
Interactive	$10/hr.	No extra charge	$10/hr.	$11.70/hr.
Remote batch	—	—	Not specified	Not specified
Central processor time:				
Interactive	$3/min.	No extra charge	$9/min.	Not specified
Remote batch	—	—	Not specified	$5-8/min.
Mass storage:				
Interactive	$0.75/1000 chars./month	$0.30/330 digits/month	$0.01/1000 chars./day	Not specified
Remote batch	—	—	Not specified	Not specified
COMMENTS	Offers services on ACTS system. $50 initiation fee. Reduced rates for non-prime hours and volume usage.	Main emphasis is on statistical reports and inventory control. Monthly charge includes CP and connect time.	Provides access to TELPRICE/70, an extensive financial data base, at a cost of $350/month.	Offers OS/MVT remote job entry services on triplex ASP configuration, plus systems analysis and design services.

All About Remote Computing Services

COMPANY	Time Sharing Resources, Inc.	Tymshare, Inc.	Uni-Coll	United Computing Systems, Inc.
GENERAL				
Name of service	Total-APL	TYMCOM-IX, TYMCOM-X, TYMNET	Uni-Coll	UCS-II, UCS-III, UCS-VI
Date operational	July 1970	1966	July 1972	1968
Areas currently served	Middle Atlantic States plus Boston Chicago, Los Angeles, San Francisco, and St. Louis	Local access in all major U.S. metropolitan areas, plus INWATS; local access in London, Paris, & Brussels	Delaware Valley	Major cities nationwide, using remote multiplexers, foreign exchanges, and INWATS
EQUIPMENT				
Computers	IBM 360/65 in Great Neck, N.Y.	Xerox 940 (24) in Cupertino, CA, Houston, Paris, & Englewood Cliffs, NJ; DEC PDP-10 (4) in Cupertino	IBM 370/168 in Philadelphia	CDC 6500, CDC 6600, CDC Cyber 73 (2), & Honeywell 265 in Kansas City; IBM 370/155 in Columbus, O.
No. of simultaneous users	95	40 per Xerox 940; 55 per PDP-10	200	640 total
Conversational terminals supported	IBM 2741 & 1050, AJ, GTE Novar, Delta Data, Hazeltine, Memorex 1240-1280, Tektronix	TTY 33/35/37, IBM 2741, and compatible units, including displays, at 10, 15, or 30 cps	"Any"	Any ASCII terminal at 10, 15 or 30 cps; Selectric or EBCDIC units at 14.8 cps
Batch terminals supported	IBM 2780, Data 100	IBM 2780 and compatible units	"Any"	CDC 200 and equivalent units; any IBM-compatible unit on 370/155
SOFTWARE				
Conversational programming languages	APL	FORTRAN BASIC, COBOL, PL/1	All System/370 languages	FORTRAN, ALGOL, BASIC
Batch-mode programming languages	FORTRAN, COBOL, BASIC, APL, PL/1, Assembler	—	All System /370 languages	FORTRAN, COBOL, Compass, all TS compilers
Principal applications	Business & scientific	Business & scientific	Business & scientific	Business & scientific
CHARGES				
Min. Monthly charge:				
Interactive	None	$80	None	$100
Re mote batch	None	—	None	$100
Terminal connect time:				
Interactive	$11-19/hr.	$16/hr.	$3.60/hr.	$17.50/hr.
Remote batch	$120/hr.	—	None	$16.50/hr.
Central processor time:				
Interactive	$18/min.	$2.40/min.	$45.00/min.	$0-36/min.
Remote batch	—	—	$27.00-58.50/min.	Varies
Mass storage:				
Interactive	$1.50/7200 chars./month	$0.50-1.00/1000 chars./month	$0.046/1000 bytes/month	$0.50/1280 chars./month
Remote batch	—	—	$0.046/1000 bytes/month	$0.50/1280 chars./month
COMMENTS	Total-APL File Subsystem facilitates processing of large shared files and data bases. Also offers financial modeling system.	Charges shown are for Type A service on Xerox 940; other service plans are available. Also operates an IBM 370/158 in Palo Alto, CA.	Offers System/370 RJE and TSO services to educational and commercial customers. Rates vary with time of day, priority, and storage utilization.	Rates depend on computer and pricing option used. Offers nationwide access to common data bases and RJE service. Royalties for special applications.

All About Remote Computing Services

COMPANY	University Computing Company	USS Engineers and Consultants, Inc.	Westinghouse Tele-Computer Systems Corp.	Xerox Computer Services
GENERAL				
Name of service	FASBAC	UEC	Remote Input Terminal System	Interactive Accounting System
Date operational	May 1969	May 1970	Nov. 1968	1970
Areas currently served	Entire U.S. (thru WATS and multiplexers), plus England, Western Europe and Australia	Pittsburgh, Phila., New York, Houston, Los Angeles, Chicago, Detroit, & 5 other cities in the Mid-West	Middle Atlantic & New England States plus Illinois, Ohio, & Michigan	Los Angeles, San Francisco, San Diego, Chicago and New York metropolitan areas
EQUIPMENT				
Computers	UNIVAC 1108's in Dallas (2), Chicago, El Segundo (2), East Brunswick, London (2), and Sydney	CDC 6500 (2 central processors)	IBM 370/165, CDC 6600	Xerox Sigma 7 (3), Sigma 9, & Sigma 3 (3) in Los Angeles; Sigma 3 in San Francisco & Chicago
No. of simultaneous users	25 per FASBAC system	Not specified	32/system	256 total
Conversational terminals supported	ASCII devices at 10, 15, & 30 cps, IBM 2741, Datel, and plotters	TTY 33/35, GE TermiNet 300, Datapoint 3300, Syner-Data, Incoterm	Various terminals at 10, 15, or 30 cps	TTY 35, IBM 2741, Datel, Execuport, Olivetti
Batch-terminals supported	UCC COPE IBM 2780 and System/360, UNIVAC 1004, etc.	CDC 1700, CDC 200, IBM 1130, Incoterm	IBM 360 & 370 computers, IBM 2770 & 2780, CDC 200, etc.	–
SOFTWARE				
Conversational programming languages	BASIC, CASH, CALC, SHOBOL, Fastext	FORTRAN, COBOL, BASIC, ALGOL	–	"Plain English" user language for data entry and maintenance
Batch-mode programming languages	FORTRAN V, COBOL, ALGOL, Assembly	FORTRAN, COBOL , BASIC, ALGOL	FORTRAN, COBOL, PL/1, APT	–
Principal applications	Business & scientific	Scientific & engineering	Business & scientific	Business
CHARGES				
Min. monthly charge:				
Interactive	$100	None	–	$1,000
Remote batch	Not specified	None	None	–
Terminal connect time:				
Interactive	$7.50/hr.	$9/hr.	–	See Comments
Remote batch	Not specified	Not specified	See Comments	–
Central processor time:				
Interactive	$20/min.	$24/min.	–	See Comments
Remote batch	Not specified	Not specified	See Comments	–
Mass storage:				
Interactive	$0.50/2096 chars./month	$1.00/10,000 chars./month	–	$1.40/1000 chars./month
Remote batch	Not specified	Not specified	$0.02/5760 chars./day	–
COMMENTS	Also offers remote batch service on CDC 6400 in Calif. and IBM 370/165's in Dallas, Chicago, & East Brunswick. (Information supplied in Nov. 1972.)	Subsidiary of U.S. Steel Corp. Lower rates for batch mode and volume usage. Surcharges for certain software.	Emphasizes remote batch processing. Prices depend upon system, type of port, and monthly volume.	Offers integrated on-line accounting system. Charges are based upon transactions entered and lines printed. All programming is done by Xerox.

All About Remote Computing Services

AVAILABILITY OF APPLICATION PROGRAMS

COMPANY \ APPLICATION	Accounts payable	Accounts receivable	Banking	Billing	Data base management	Educational	Engineering	General ledger	Hospital administration	Information retrieval	Insurance	Inventory control	Numerical control	Operations research	Payroll	Personnel	Project control	Sales analysis	Scheduling	School administration	Scientific	Simulation	Statistical	Text editing	Typesetting
ACTS Computing Corporation	●	●	●		●	●	●	●		●		●	●	●	●	●	●	●	●	●	●	●	●	●	
APL Services, Inc.			●		●	●	●			●	●	●	●	●			●	●	●		●	●	●		
Applied Data Research, Inc.	●	●		●			●			●		●			●	●		●			●	●	●	●	
Applied Logic Corporation			●		●		●			●				●			●		●		●	●	●	●	
Axicom Systems, Inc.							●														●	●	●	●	
Beloit Computer Center, Inc.	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Boeing Computer Services, Inc.			●	●	●	●	●			●			●	●			●		●		●	●	●	●	
Bowne Time Sharing, Inc.																								●	●
Chi Corporation	●	●	●	●	●	●	●	●		●		●	●	●	●		●	●	●	●	●	●	●	●	●
Community Computer Corporation		●	●	●	●	●	●	●				●			●		●	●					●	●	
The Computer Company, Inc.			●		●		●			●				●	●		●	●	●		●	●	●	●	
Computer Innovations					●	●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	●	●	
Computer Network Corporation	●	●		●	●	●	●	●		●		●	●	●	●	●	●	●			●	●	●	●	●
Computer Research Company																								●	
Computer Resource Services, Inc.	●	●	●	●	●	●	●	●		●	●	●		●	●		●	●					●		
Computer Sciences Canada, Ltd.	●	●			●		●	●		●		●		●	●		●	●				●	●		
Computer Sciences Corporation			●		●		●			●				●			●		●		●	●	●		
Computer Sharing Services, Inc.	●	●	●	●	●	●	●	●	●		●	●		●	●		●	●	●	●	●	●	●	●	
Computer Spectrum	●	●		●	●	●	●	●	●	●		●			●	●	●	●	●	●	●		●	●	
Computercraft Services, Inc.	●	●		●	●	●	●	●		●	●	●	●	●	●	●	●	●	●		●	●	●	●	
Computility, Inc.					●		●			●				●		●	●				●	●	●	●	
Compu-Time		●	●	●		●	●	●		●		●			●		●	●	●		●	●	●	●	
Computone Systems, Inc.											●			●											
Com-Share, Incorporated	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Com-Share Limited	●	●		●	●	●	●	●		●	●	●	●	●	●	●		●	●		●	●	●	●	
Control Data Corporation					●		●			●			●	●	●	●	●	●	●		●	●	●	●	
Cyphernetics Corporation					●		●			●		●		●			●	●	●		●	●	●	●	●
Data Resources Inc.										●			●					●				●	●		
Data-Tek Corporation	●	●		●	●		●	●		●	●	●		●	●		●	●			●	●	●	●	
Datacrown Limited					●		●			●					●		●		●		●	●	●	●	
Dataline Systems Limited	●	●		●	●	●	●			●		●		●	●		●	●	●		●	●	●	●	
Datalogics, Inc.								●			●						●	●	●		●	●	●		
Dialcom, Inc.	●	●				●		●		●		●			●	●			●	●	●	●	●	●	
Fedder Data Centers, Inc.	●	●						●				●			●		●	●							
First Data Corporation			●		●	●	●			●		●		●			●	●	●		●	●	●	●	●
First National Bank of Memphis	●	●	●	●	●	●	●	●		●	●	●	●		●		●	●			●	●	●	●	
Fulton National Bank		●	●		●	●	●	●			●	●	●	●	●	●		●			●	●	●	●	
General Electric Company	●	●			●		●	●	●			●	●	●	●	●	●	●	●		●	●	●	●	
Genesee Computer Center, Inc.							●					●	●	●			●				●	●	●		
Grumman Data Systems Corporation					●		●		●	●			●	●		●	●		●		●	●	●	●	
GTE Data Services Incorporated					●		●			●				●							●	●	●	●	
HDR Systems, Inc.							●							●			●		●		●	●	●	●	
Honeywell Information Systems, Inc.	●	●			●		●	●		●		●	●	●	●	●	●	●	●		●	●	●	●	●
Information Systems Design					●		●						●	●			●		●		●	●	●	●	
Interactive Data Corporation			●		●					●				●					●			●	●		
Interactive Sciences Corporation	●	●			●		●	●		●		●		●		●	●				●	●	●	●	●
International Timesharing Corporation	●	●	●	●	●	●	●	●		●		●	●	●	●	●	●	●	●		●	●	●	●	
ISC/Pryor Computer	●	●		●				●				●			●		●	●				●	●	●	
Kaman Aerospace Corporation						●	●			●				●		●	●		●		●		●	●	
Keydata Canada	●	●		●				●				●						●							

All About Remote Computing Services

AVAILABILITY OF APPLICATION PROGRAMS (Continued)

COMPANY \ APPLICATION	Accounts payable	Accounts receivable	Banking	Billing	Data base management	Educational	Engineering	General ledger	Hospital administration	Information retrieval	Insurance	Inventory control	Numerical control	Operations research	Payroll	Personnel	Project control	Sales analysis	Scheduling	School administration	Scientific	Simulation	Statistical	Test editing	Typesetting
Keydata Corporation	●	●		●	●			●	●	●		●					●	●					●		
Leasco Response Incorporated		●			●	●	●	●		●	●			●	●		●	●	●		●		●		
Management Systems Corporation	●	●		●		●	●	●			●			●	●		●	●	●		●	●	●	●	●
Manufacturing Data Systems, Inc.													●												
Mark/Ops	●	●	●	●	●		●	●		●		●			●	●	●	●			●	●	●	●	
McDonnell Douglas Automation Co.	●	●			●	●	●	●	●	●			●	●	●	●	●		●	●	●	●	●	●	
Merlin Systems Corporation																							●		
Metridata Computing, Inc.	●	●	●				●							●								●	●		
Multiple Access Limited		●			●		●	●						●			●	●			●	●	●	●	
National CSS, Inc.		●		●	●		●	●		●		●		●		●		●			●	●	●	●	
Ohio Valley Data Control, Inc.		●	●						●	●					●										
On-Line Business Systems, Inc.								●		●		●					●								
On-Line Systems Inc.			●		●		●			●		●	●	●			●		●		●	●	●	●	
Pacific Applied Systems, Inc.																					●	●			
Pacific International Computing Corp.										●		●							●		●	●	●	●	
Paden Data Systems, Inc.	●	●		●				●				●			●			●							
Philco-Ford Corporation		●	●	●	●	●	●	●		●		●			●	●					●		●		
Phoenix Data Limited	●	●			●	●	●	●		●		●	●		●	●	●	●	●	●	●	●	●	●	
PRC Computer Center, Inc.					●		●	●	●	●					●	●	●				●	●	●		
Profile Technology, Inc.	●	●		●		●	●	●		●	●	●			●	●			●	●	●		●	●	
Programs & Analysis Inc.	●	●		●				●				●			●		●	●	●	●					
Proprietary Computer Systems, Inc.	●	●	●	●	●		●	●		●		●	●	●	●	●	●	●	●		●	●	●	●	
Rapidata, Inc.					●	●	●			●	●	●		●		●	●	●	●		●	●	●	●	
Remote Computing Corporation	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●		●	●	●	●	
SBC Data Services	●	●	●				●			●					●	●		●	●		●	●	●	●	
Scientific Process & Research, Inc.							●															●			
Scientific Time Sharing Corp.	●	●		●	●		●	●		●	●	●		●	●	●	●	●			●	●	●	●	
Sci-Tek Incorporated					●		●			●			●	●					●		●	●	●		
The Service Bureau Corporation			●		●		●			●	●			●		●	●				●	●	●		
I.P. Sharp Associates Limited	●	●	●	●	●	●	●	●	●	●	●	●		●			●	●	●		●	●	●	●	
The Singer Company	●	●			●		●			●		●	●	●	●		●	●			●	●	●	●	
Statistical Tabulating Corporation	●	●					●	●		●	●	●			●		●	●			●	●	●		
Structural Dynamics Research Corp.							●						●								●				
Systems Dimensions Limited		●		●	●		●			●		●		●	●		●		●		●	●	●	●	
Technical Advisors, Inc.							●																		
Technology for Information Management	●	●		●	●		●	●		●	●	●			●		●	●	●		●	●	●	●	
Tel-A-Data, Inc.		●								●		●		●	●			●					●		
Telstat Systems, Inc.			●							●				●											
Texas Instruments Incorporated	●	●		●	●	●		●	●			●	●	●	●	●	●	●	●		●	●	●		
Time Sharing Resources, Inc.	●	●	●	●	●	●	●	●		●	●	●	●	●		●	●	●	●		●	●	●	●	
Tymshare, Inc.	●	●	●		●		●	●		●		●		●			●	●	●		●	●	●	●	
Uni-Coll	●	●		●	●	●	●		●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	
United Computing Systems, Inc.	●	●			●		●	●		●			●								●	●	●	●	
University Computing Company					●	●	●			●		●	●	●	●		●				●	●	●	●	●
USS Engineers and Consultants, Inc.							●			●			●		●		●				●	●	●		
Westinghouse Tele-Computer Systems							●						●	●			●		●		●	●	●		
Xerox Computer Services	●	●		●					●			●			●	●	●	●	●						