Computerized Directory Assistance System

RC Computer


System
RC45
PF1
PF2
PF3
PF4
Attn
Sys Rq
Clear
Selct
Cursr
Sel
Erase
EOF
ErInp
Chg Sc
Recrd
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Ident
Play
SetUp
Ctrl
Reset
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Introduction

All over the world Directory Assistance Systems are used for retrieval of telephone numbers, telex numbers and other information from directories.

The computerized Directory Assistance System from RC Computer (CDAS) is based on a multiparameter search strategy.

The CDAS operates with hitrates exceeding 95% and the system more than doubles the operator's efficiency compared to conventional systems.

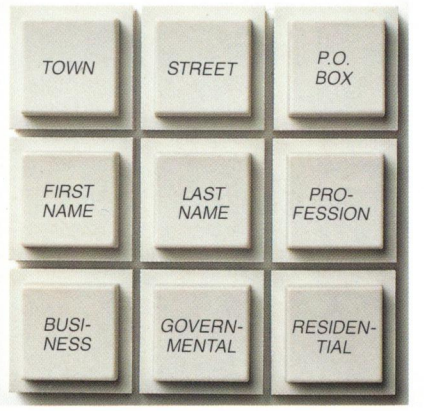
Directory Assistance operators as well as callers were often frustrated because of the inability of traditional Directory Assistance service to handle the following problems:

- alternative spellings of names, streets, etc.
- alternative profession designations (lawyer, barrister, attorney, etc.)
- acronyms (BP for British Petroleum).
- the caller has only a vague idea of the location of the subscriber.

Thus, a Directory Assistance system must incorporate facilities that allow search tolerance on various spelling forms, multiple names, and a flexible area/location search strategy.

The CDAS is based on a multi-parameter inquiry concept. As complete flexibility in creating search entries to the system is provided, inquiries may consist of:

- first names, last name, street, house number, building name, flat number, p.o. box number, area, profession, subscriber type (business, government, residence), or any other element extracted from the subscriber data.



In some countries it is necessary to operate with several alphabets (e.g. Arabic and Latin). Therefore, the CDAS features bilingual operation if needed.

The flexibility in the way of keying an inquiry guarantees successful responses. Less detailed, more varied information may be given by the caller.

In order to get a fast and successful response it is vital that the amount of necessary information is minimized, and at the same time, inaccuracies within the information should be taken into account. For this purpose the system offers the following facilities:

- Phonetization Features used to handle misspelling and alternative spellings of names, streets, etc.
- Synonymization mechanisms handling abbreviations for common names, locations, etc. to reduce keystrokes, several designations for same or related professions, nationalities, streets.
- Hierarchical search for listings in caption groups.
- Area/Location Handling eliminating the problem of fixed borderlines between localities and discrepancies between geographical areas and numbering plans.
- Utility lists consisting of fixed pages that may be accessed by a single or very few keystrokes. These pages may hold any information, e.g. frequently requested numbers (hotels, cinemas, etc.), emergency information (police, fire brigade, etc.), operator instructions.

Additional Information
concerning the individual subscribers may be included using one or more of the following facilities:

- additional search entries (for acronyms, etc.).
- extra listings (for several users of same telephone).
- related/sub listings (several numbers for same user e.g. branch offices, departments).
- supplementary text (opening hours, product range, etc.).

Automatic Voice Response
of the retrieved telephone number.

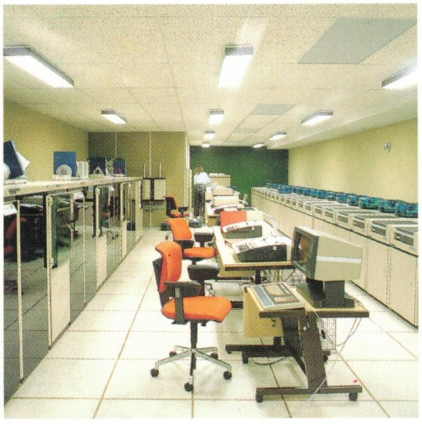
Online Update
of subscriber records as well as system tables ensures the actuality of the database.

System Components

The Computerized Directory Assistance System consists of the following hardware building blocks:

- RC8000 general purpose computer for central data processing and data retrieval.
- RC3502 minicomputer system for data communications, front-end, and remote-end processing, and
- RC45 display terminal system.

All the system components are programmed in a high-level multiprogramming language. This gives a high degree of reliability and flexibility of the system implementation, which nevertheless still keeps response times extremely low.



RC8000
RC8000 is a powerful minicomputer acting as database processor. Peripheral devices such as printer, tape and console are connected via a common device controller. The front-end system consists of one or several RC3502 communications controllers.
RC8000 handles:
- database retrieval
- database update
- system access check
- system load
- transaction logging
- statistics

The very flexible structure of RC8000 makes it possible to construct systems which are able to handle databases from relatively few subscribers up to several millions.

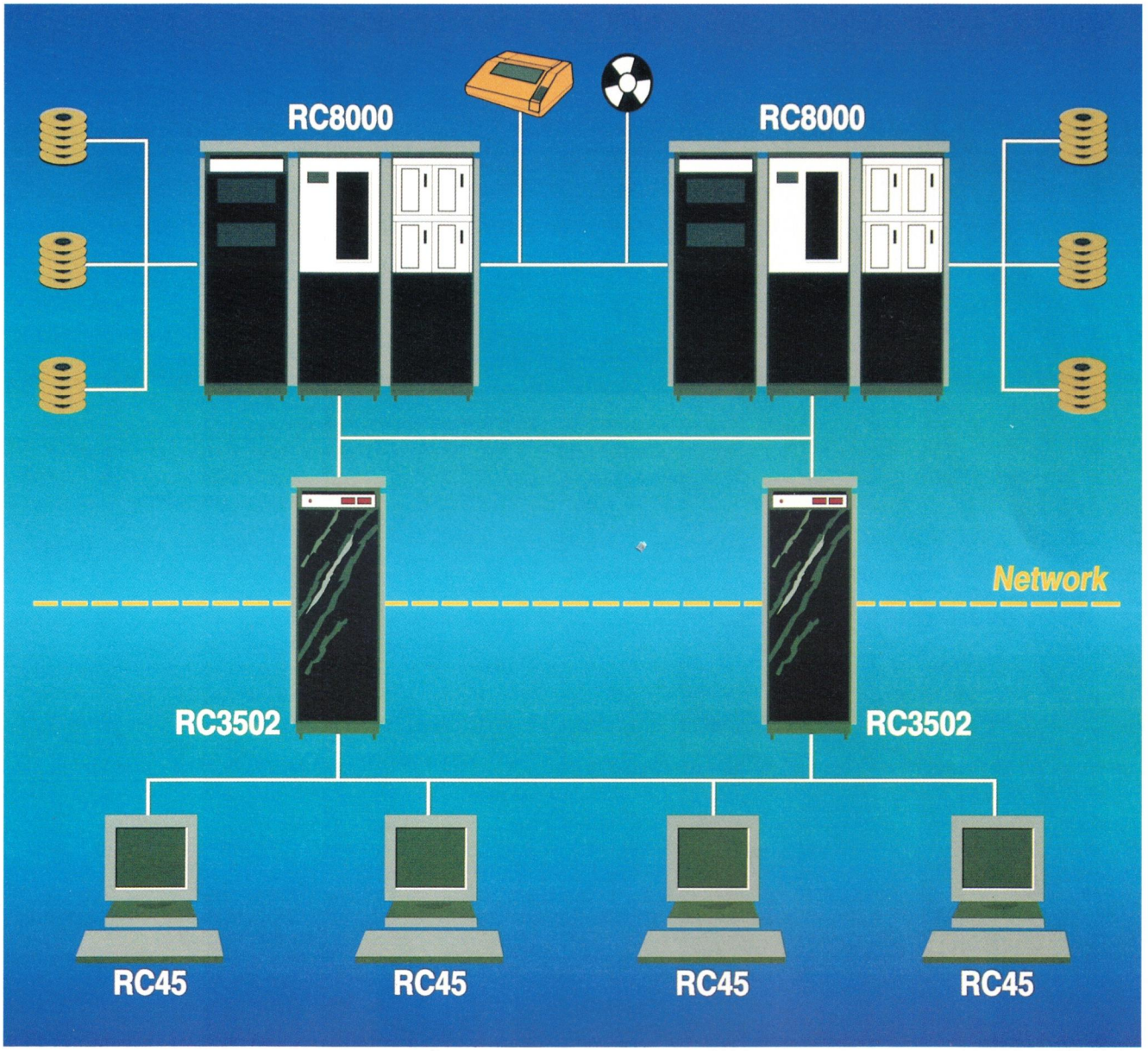
RC3502
The RC3502 communication system is designed to meet great demands with respect to performance, reliability and versatility. Due to the unique flexibility of the RC3502 input/output system, the computer is quite applicable to a Directory Assistance System.

RC3502 is an outstanding communications controller and frontend processor for the RC8000 system.
RC3502 handles:
- transaction routing to/from RC8000 and RC45
- interface to Automatic Call Distribution System
- hardcopy printer
- down-line (program) load of RC45 terminals
- terminal output display formatting
- automatic voice response

RC45
The RC45 CDAS terminal is a special version of the intelligent RC45 display terminal for use in Directory Assistance Systems.

The RC45 CDAS terminal combines the newest microprocessor and very large scale integration technology, providing ample local processing power, with proper ergonomics and high resolution.
RC45 handles:
- function key interpretation (custom designed keyboard)
- transaction generation
- formatted input
- handling of information from Automatic Call Distribution System
- load distribution

System Solution



The Dual System Concept
One RC8000 computer can handle a large amount of inquiries. However, due to strict requirements for 7-days-a-week, 24-hours-a-day operation the system is doubled. The second system is not just hot or cold stand-by, but shares the load with the other RC8000. The system thus avoids the problems of a stand-by system that turns out to be defective when put into operation, and furthermore adds ample processing power to the system. A typical configuration is shown on the figure.

Processing power may be increased by adding one or more of the system components in parallel.

Features

The CDAS from RC Computer system may be extended with special features as described below.

Intercept
The CDAS system may be used as a part of an intercept service for handling changed numbers. When referring to the old telephone number the new telephone number will be given.

Telex
Telex subscribers may be included in the database enabling access via search inquiries, etc. similar to telephone subscribers.

International Calls
The CDAS may be extended with dialling codes for countries, foreign areas, cities, rates and dialling instructions thereby allowing international exchange operators to retrieve these through the CDAS system.

Blacklisting/Call Barring
By connecting the CDAS system to the direct-dial international exchange the updating of call barring lists in the exchange can be done through the CDAS system.

National Communication Rates
The CDAS may provide information about communication rates between national subscribers or localities. This information can be retrieved through search inquiries.

General Information Retrieval
The CDAS may even provide general information such as Pharmacies on duty at specific dates. This type of information can be retrieved through search inquiries.

Directory Production
The system may produce floppy discs or magnetic tapes with formatted directory information ready for entry in type setting or photocomposing equipment.

Security
The duality of the database ensures availability of the latest information in case of failure on one part of the system. Furthermore, a strict access check (through passwords) is performed for all transactions entered.

Supervisor Facilities
The supervisors responsible for the daily operations may
- update access rights
- monitor (on the terminal) any other terminal
- take over difficult calls from customers
- produce load surveys

An alarm message will be displayed on the supervisor's terminal if an operator makes a serious error (attempting to pass access rights) or does not respond to certain events.

Memo Handling
Failures or inaccuracies experienced by an operator through communication with a caller and the CDAS system may be logged in the database for further investigation by maintenance staff.

Integration with Automatic Call Distribution system
The CDAS may be integrated with the telephone network via an Automatic Call Distribution system, thus providing more advanced facilities such as
- extensive operator statistics
- automatic voice response
- advanced billing methods
- advanced call transfer between operator positions

Voice Response
To reduce the average working time an automatic voice response system is used. The operator selects the correct telephone number on the display and the automatic voice response system takes over the call and informs the calling subscriber about the number. This facility can reduce the average working time by more than 25 per cent.

Statistics
A continuous logging of transactions provides the basis of extensive statistics. These may be broken down into time periods, groups of operators and terminals, individual operators and terminals, system totals, etc.

Communication
The CDAS architecture provides maximum flexibility for networking between database centers and operator terminals.

Depending on distance and communication media available the CDAS may utilize.
- Local Area Network
- point to point connection, e.g. within 100 meters operator terminals may be connected using dedicated 5 Mbps serial links
- dedicated Wide Area CDAS network
- existing public or private networks such as X. 25.

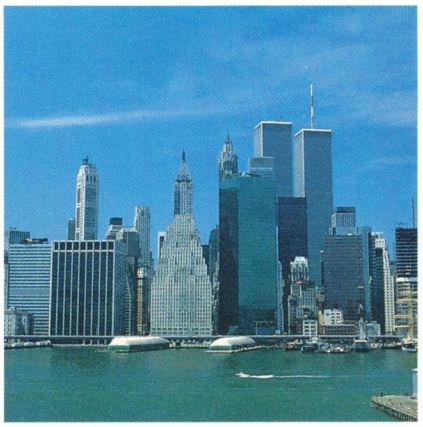
Direct Customer Access
The CDAS may provide full or restricted Direct Customer Access enabling subscribers to obtain directory information from their own terminals using most common protocols.

RC Directory Assistance Throughout the World

RC's Directory Assistance System was developed after several years of investigation in a large pilot project.

The first installation has been in operation at Jutland Telephone, Denmark since 1977.

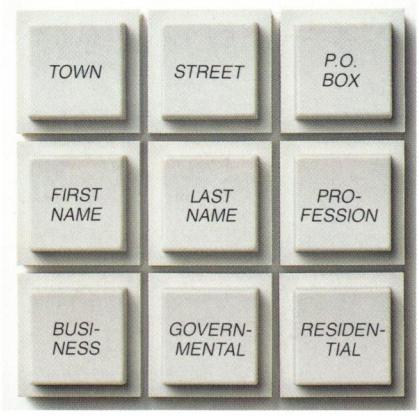
Today all the telephone companies in Denmark are using the CDAS. The system is integrated with the packet switching network PAXNET enabling every Danish telephone subscriber to use the service.



The RC CDAS is widespread all over the world, e.g. in the U.S.A., Europe and the Arabic countries.

One of the largest installation in the U.S.A. has more than 5 million subscribers, and far beyond 2000 terminals are connected to the system.

A special version of the RC CDAS handling both Arabic and Latin characters has been sold to the leading telephone companies in the Arabic countries.



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