SOCRATE, CLIO, ORCHIS-base:

30 Years of Publishing in Data Management at Grenoble

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Abstract

This text covers 30 years of software engineering in Grenoble, France. It highlights expertise in database management systems and 4GL languages.

The focus is on the software publishing sector at SYSECA, a French subsidiary of the THOMSON Group. It shows successes, competition impacts, and technological trends. It also discusses cooperation between research and industry and the influence of markets and business governance. The evolutions of Hardis Group in Grenoble and Software AG in Darmstadt serve as examples of resilience and dynamism during this time.

We hope to bring a story that strengthen today's activities for a better tomorrow, learning from past mistakes.

Acknowledgments

I want to thank my former colleagues at SYSECA for proofreading the articles on SOCRATE. Special thanks to Georges Vigliano, one of the creators of this amazing product, and Pierre Couillerot, a key figure in our work, especially for the IBM version and for leading the CLIO activity after 1992.

I also appreciate Christian Balmain, founder of Hardis Group, for welcoming me and allowing me to explore consulting and discover ADELIA, another sucess story in software publishing at Grenoble.

Finally, thanks to Xavier Hiron from Aconit for his editorial advice.

Introduction

Since the 2000s, digital technologies have changed how we use data daily. Depending on our needs, devices like computers, tablets, and smartphones connect with servers or each other in a "peer-to-peer" way through communication networks. Thanks to better microelectronics, systems are now more efficient in volume and flow rates.

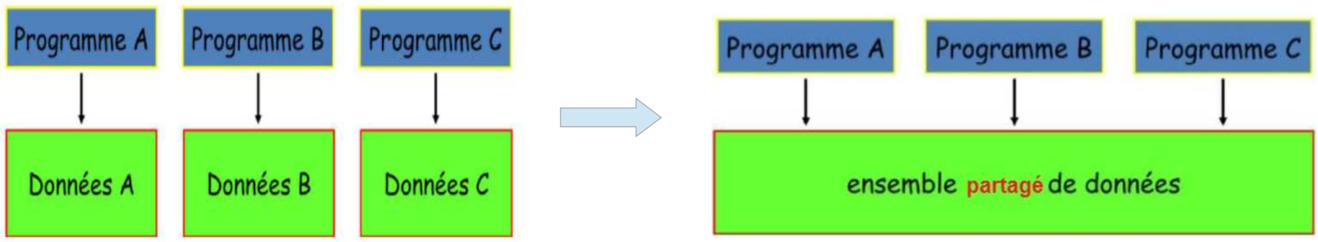
We are realizing how crucial information is, especially for our personal lives and organizations. The term "big data" refers to the massive scale of capturing, searching, sharing, storing, analyzing, and presenting data. This vast amount poses a major challenge for both Web giants and society. In just a few decades, we've shifted from handling sheets of paper to managing huge volumes of text, images, and sounds. In this area, software creators in Grenoble have played a key role.

Late 1960s: Birth of the Database Concept

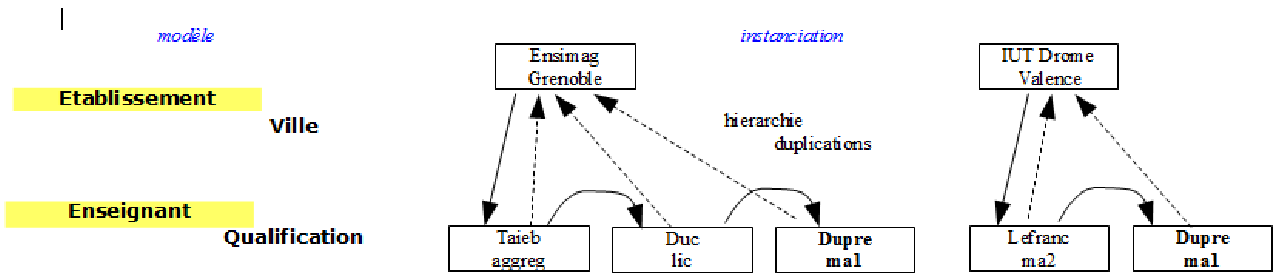
In the 1950s, the first computers used machine language. Since then, advanced languages like FORTRAN, COBOL, PL1, and ALGOL have emerged. As data became organized into files, programs became tightly linked to these files. Any change in a file's structure meant recompiling programs and rebuilding applications.

This led to issues with sharing, protection, confidentiality, and security. To address these problems, database management systems (DBMS) were created. They offered:

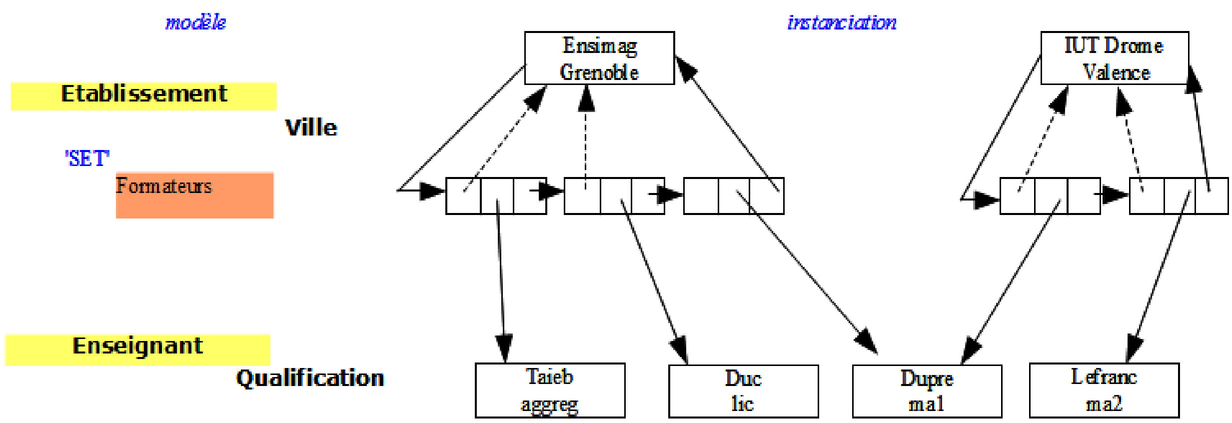
- ways to describe and organize data structures
- normalized data manipulation for programs
- better sharing, concurrency, protection, and safeguarding.



Early DBMSs used a basic **hierarchical model** for data, like workbooks and cards. They were not flexible, and accessing data needed costly tree runs.



This led to the development of a **network model** organized into collections of objects called "SETs." This model allowed for managing more complex dependencies. The DBMS enabled programs to browse SETs and perform useful operations on records. As a result, programs depended on the links defined by the data structure.



This model is the first commercial approach to DBMSs. In 1962, General Electric, led by Charles Bachman, launched the Integrated Data Store (IDS) software. At that time, IBM was offering the Information Management System (IMS), which was still hierarchical.

Many network DBMS products followed, including DBMS, PICK, TOTAL, and SYSTEM 2000. In 1967, the CODASYL[1] consortium published an international standard. This standard included two parts: DML (Data Manipulation Language) for data handling and DDL (Data Definition Language) for data definitions.

A Research Project at Grenoble University (IMAG): SOCRATE

In the mid-1960s, some researchers at IMAG labs noticed a rising demand for management information technology. Until then, this tech focused mainly on payroll and accounting, using mechanography. They reached out to American researchers, confirming this growing trend. Pioneers like Jean Kuntzmann, Louis Bolliet, and François Peccoud faced challenges in getting management information technology accepted in the Grenoble scientific community. Managing data was not seen as “advanced.”

The French "Plan Calcul" (a stategic plan sustained by government to develop computer industry) has encouraged training in U.S. universities, and helped in the establishment of a major IBM center in Grenoble. One of IMAG's first projects began in 1969, funded by IRIA, an organization formed two years earlier as part of this plan.
A team led by Jean Raymond Abrial and several PhD students, including Georges Beaume, Robert Morin, and Georges Vigliano, began to develop a prototype of an advanced network-type DBMS called SOCRATE..

The definition langage of SOCRATE allowed to create network data models.

```
/* This is an example of  DDL   schema                              */
/* This"schéma"  (data base structure) is defined                    */
/*    but can be updated, even if data exists in the data base !     */
ENTITY 100   college
   BEGIN
   name  CHAR (30)
   city     CHAR (40) WITH ORDERED KEY
   ...
   ENTITY  100  teachings
       BEGIN
       subject     STRING (40)
       ...
       END
   teachers  LIST WITH  SINGLE CHAIN
   ....
   END
ENTITY 50 teacher
   BEGIN
   name  CHAR (30)
   qualification (15  12) ( bachelor, master, doctorate)
   salary DECIMAL  (5V2)  FROM   1200,00  TO  4500,00
   school         REFERE  teachers FROM  A  college   WITH SINGLE CHAIN
    ....
   END
associate REVERSE EVERY  teacher
```

The above example illustrates the ability to define hierarchies (nesting of “ENTITY”), lists (“RING”) and references. LDD also allowed to specify indexes, called “DICTIONARIES,” as declared above (“WITH KEY...”). Indexes allowed direct access to data, avoiding the need to browse through hierarchies or lists. They also ensured that sorting was maintained.

1 https://nvlpubs.nist.gov/nistpubs/Legacy/hb/nbshandbook113.pdf

It was possible (subject to certain rules) to complete a schema for an existing database.
This only affected the user programs concerned by the additions or deletions.

This prototype was using a powerful manipulation language for data access and modifications. It could fully replace COBOL.

```
/* This an example of DML    */
/* Commands                  */
/*  Q to query               */
/*       or print 'string'   */
/*  C to create              */
/*  U to update              */
/*  D to delete              */

Q '*** List of associates ****'
Q name OF EACH associate

Q '*** List of teachers at Crossfield ***'
FOR A College WITH name = 'Crossfield'
   Q name
   Q city
   Q 'teachers='
   Q name OF EACH teachers
END ?
'
Q '*** Creation of a teacher ***'
C A teacher X2
/* X2 is a cursor / in DML there are a fix number of cursors X1 to X16 */
FOR X2
   U name = 'Smith'
   U qualification = 'doctorate'
   /* salary will be updated later .. It is still undefined / NIL keyword */
   U salary = NIL
FIN
C A associate = X2

Q '*** Assignement ***'
C A teachers FROM A college WITH name = 'Derry' = A teacher X2
```

This kind language is now known as a 4GL (4th generation language).

These two languages required
- the creation of a compiler (lexical analysis, query analysis, machine code generation). Programs and subprograms were stored in the database memory by a librarian
- physical data management to handle disk allocation, but also memory storage (of the “cache” type, to use current terminology) with a simple and efficient addressing system based on a “hash code.” This technique made it possible to allocate data from a virtually infinite logical space (“virtual space”) to a very limited real space, minimizing disk access.

‘Navigation’ techniques using links and indexes (“dictionaries” in SOCRATE) also contributed to these reductions in access.

A database was organized into “spaces”: for description (structure, ‘schema’), for programs, for temporary files, for data, and for indexes (“dictionaries”).

Local administrations, like university hospitals and education authorities, saw the benefits. They were getting involved, using, and supporting this innovation.

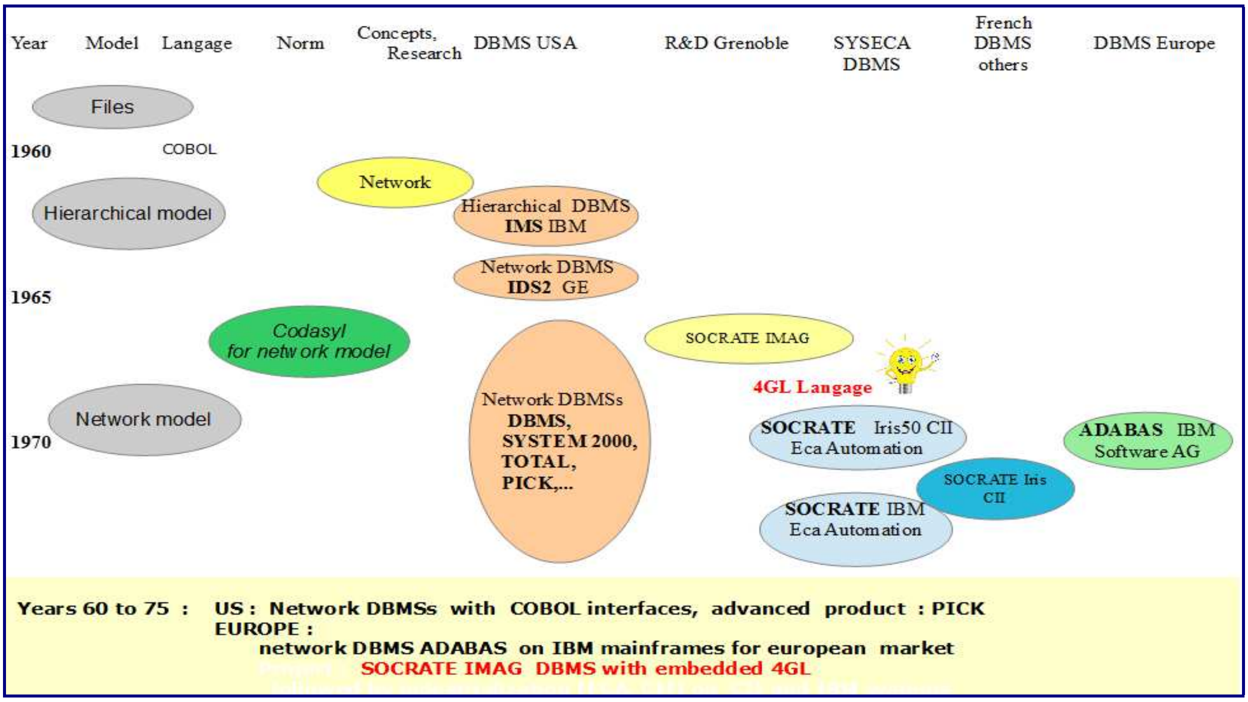
In this first prototype, SOCRATE was still offering many features: a definition language and a 4GL manipulation language for program writing. The 4GL programs were stored in the database using a "librarian" function. A "macro-generator" tool helped simplify the writing process. Programmers no longer needed to manage the physical layout of objects, such as programs and data. An innovative algorithm organized an almost infinite "virtual space" on disk, even though disk space was limited at the time. It also minimized access to a memory "cache." SOCRATE was really simple and efficient !

In 1970, the prototype was developed on an IBM 360/67 using PL1 language. R&D work continued until 1973. The Grenoble Hospital and the local education authority (French « Rectorat ») used the prototype for their first computerization efforts. In 1974, an agreement was signed with the local IT division (« AEIO ») at the Health Service (French « securite sociale ») to produce SOCRATE on a CII IRIS 50. This first industrial version took three years to complete. A team of engineers from ECA Automation, led by Stephen Stepanian, worked on it. At that time, CII also marketed SOCRATE on both IRIS 50 and IRIS 80. However, the merger into BULL ended this production, which was replaced by IDS2 and later by ORACLE.

In 1974, after the ECA/AEIO operation, the Regional Health Insurance Fund (CRAM) requested an IBM 370 version. At ECA_Automation, the team for IRIS 50 split up, and the IBM version took 24 months to complete. This marked the start of a long industrial journey.

From a technical view, SOCRATE worked well, easy to program with its 4GL and could interface common programming languages like COBOL. It was user-friendly, efficient, reliable, and portable. Databases could be easily transfered between devices. And SOCRATE could be operated in many ways : conversational, transactional, or real-time. So many advantages !

So, in the early 70s, CODASYL DBMS had reached maturity, leading to mostly American production. Yet, European challengers like SOCRATE and ADABAS from Germany were emerging.



New Trends: The Relational Model

By the late 1960s, American research aimed to enhance the CODASYL model.

Research made by Edgar Frank **Codd** work at IBM led to a clear and structured way to organize data, using algebraic theory.

His key paper, "A Relational Model of Data for Large Shared Data Banks," was published in CACM 13, No. 6, June 1970. This marked the birth of the relational model, which we still use today.

Several R-DBMS developments will follow:

- **SYSTEM-R (1970)**: Developed at IBM's Research Center in San Jose. It introduced SEQUEL, the precursor to the standardized SQL language, combining DDL and DML clauses.
- **INGRES (1973)**: Created by Mickaël Stonebraker's team at the University of Berkeley. They defined the QUEL language.
- **MRDS (1976)**: Launched by Honeywell, this was the first marketed R-DBMS.

1970-1980 IMAG: Relational Model and Distributed Databases

In Grenoble, IMAG and IBM worked closely together during this time. An IBM research center was set up in IMAG labs. Some IMAG researchers did post-doctoral work at the IBM San Jose Research Center in California.

They teamed up with E.C. Codd's groups to advance **centralized and distributed Relational Databases**. For instance, Claude Delobel focused on the theory of functional dependencies in the relational model. Michel Adiba contributed to the R* project, a distributed version of System-R. Along with B. Lindsay, he introduced the idea of "snapshots."

Delobel and Adiba also published a book with Dunod titled "**Databases and Relational Systems**."[2] This book helped develop training in these areas at universities and in continuing education with various French companies.

At IMAG, several projects ran from 1970 to 1980. They aimed to share and distribute information systems. INRIA and the CII-HB research centers collaborated on these projects.

Using the CYCLADES network, they developed **distributed DBMS** projects like SIRIUS, POLYPHEME, and URANUS. These projects focused on modeling, languages, and systems for integrating, querying, and manipulating diverse data. This effort built a strong French community in these fields, with Grenoble playing a key role.

2 https://openlibrary.org/books/OL3021463M/Relational_database_systems

1970-1980 ECA Automation: Industrialization of SOCRATE

ECA Automation, based in Paris, opened an office in Grenoble. Here also, TELEMECANIQUE, focused on automation, began making mid-range computers for industrial use (T1600, T2000). Robert Morin, a former SOCRATE PhD student, had joined this company.

In 1976, he settled a partnership with ECA Automation to develop SOCRATE on the new SOLAR mini-computer.

This hardware featured 16-bit words, a bus, 32K memory, and a 5M disk. It mainly targeted real-time and industrial applications.

In the industry, DBMS tools were emerging for real-time and embedded applications that managed complex, large data sets. Robert Morin led the development of SOCRATE on SOLAR.

After two years of development, SOCRATE was delivered for Batch BOS-D and multi-user system TSF.

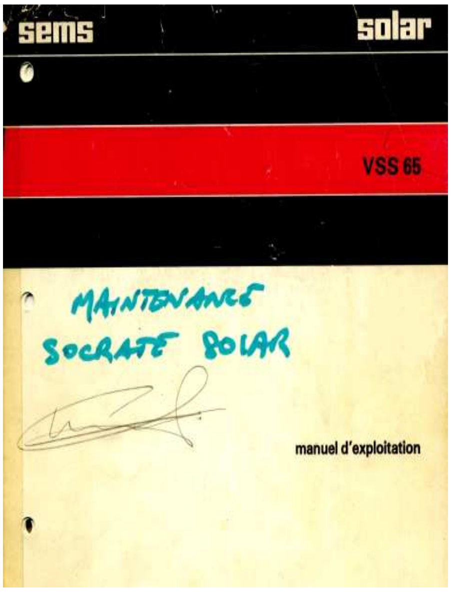
From ideas of JR.Abrial, the management of the virtual space had been implemented in an electronic board for addressing.

This optional accelerator device called VSS **65** (for virtual storage system) received a patent.

In 1979, C.Jullien ported SOCRATE on the real time system   RTES-D for industrial and startegic applications (for exemple, SYCOM, a system for french navy).

A screen manager was also developped for conversational use for new semi-graphic terminals.

This sytem has been used for implementation of distributed DBMS[3] at ECA Automation.



At that time, SOCRATE was also supported by SIEMENS hardware. It worked well with IBM, and sales were rising in France.

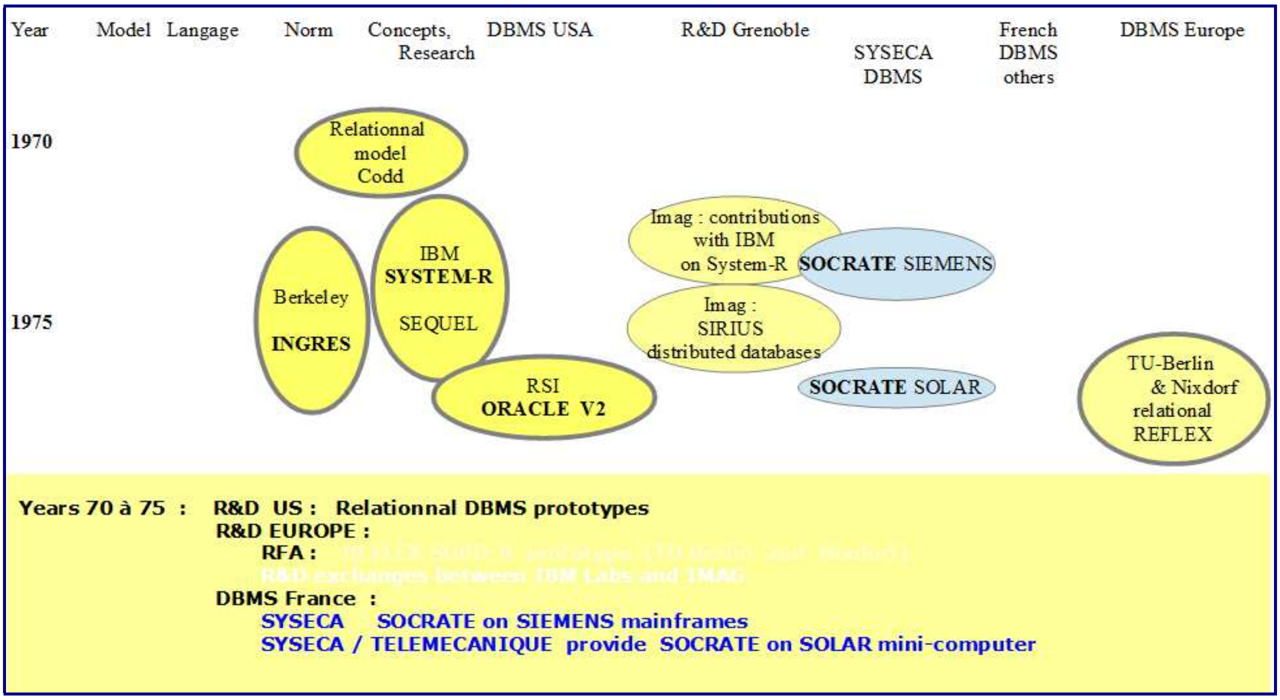
Thanks to the IBM versions and a breakthrough in the mini-computer market, SOCRATE became a well-known product among professionals.

Though it laged behind its German competitor ADABAS, which relied only on IBM, SOCRATE was starting to build a reputation in the US.

3 Distributed databases in a mini computer network. Pierre Thellier. General Manager ECA Automation S.A. Teleinformatics IFIP, North Holland Publishing 1979 pages 185-191

In Europe, German R&D were also interested in the relational model.

In 1977, the Technical University of Berlin (TU Berlin) and NIXDORF worked together and created a German prototype of R-DBMS named REFLEX.



The 1980s: Rise of American R-DBMS products and standardization

After SYSTEM-R and INGRES, R-DBMSs saw a big commercial boost. Start-ups like ORACLE and SYBASE, along with established names like IBM/DB2 and INFORMIX, led the way.

IBM took time to promote DB2, the industrial version of SYSTEM-R, due to IMS's large customer base. Meanwhile, ORACLE quickly gained the lead.

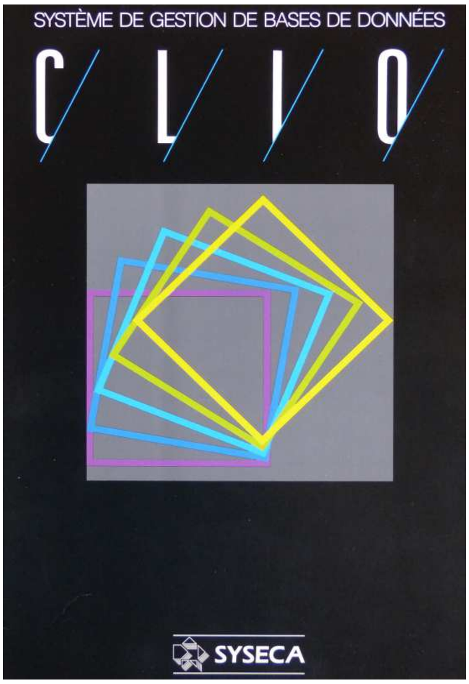
MySQL, a free option popular with web developers, has been launched in Sweeden much later, by MYSQL-AB in 1995.

ANSI published the first SQL language standard in 1986, which ISO adopted in 1987 (ISO/IEC 9075:1986). This was helping portability of applications . ISO made two major updates in 1989 and 1992.

In France, SOCRATE became CLIO, the top DBMS provider...

In the 1980s and 1990s, SOCRATE had to change its name, as the trademark had already been registered. It had been renamed CLIO, with a more industrial "look", commercial support, professional publishing and distribution structure within SYSECA (ECA-Automation has changed its name in its backing of the THOMSON-CSF group).

Grenoble was a centre of development, Parisian services were driving commerce, training and marketing. A user club was held every year with workshops, which contributes to the decisions on the evolution of the product. There were approximately 80 people employed in these activities between the two sites.



CLIO was rewritten in a macro-language[4].
A porting technique, based on this macro generator, allowed it run on many machines beyond IBM and SOLAR:

- BULL GCOS 6/7/8
- DEC-VAX
- HP-9000
- PC Windows ...

It came in various setups, like transactional and client-server.

Over 1,000 sites in France were using CLIO, including big names like EDF, SNCF, DEFENSE, AEROSPACE, COGEMA, banks, and insurance companies. CLIO also had US clients in Los Angeles, like ORC (operational until 2000) and First Bank

The competition from R-DBMS was strong, especially now that ORACLE had a presence in France. Customers wanted CLIO to be standardized and remain hopeful. But how do we compete with the US giants ? THOMSON lacked a strong software publishing culture, and SYSECA was mostly focusing on specific projects and services . Even as a leader in its country, what can we do against rivals praised in the specialized press ?

CLIO's managers will focus on one strong point: 4GL. This language allowed for developing applications at lower costs than 3GL+SQL layouts. The MUST project has targeted a 5th generation language as part of the European Esprit R&D projects. The THOMSON Group's IT Services Branch (BSI) has boosted this project by acquiring the American NOMAD business from Dun & Bradstreet. This purchase would have provided a commercial base in the USA. There were plans to produce SQL on CLIO in MUST, but managers did not see this as a priority. About 40 people worked on MUST in Grenoble from 1986 to 1990.

Germany's independent company, Software AG, will adopt a similar strategy. They were publishing the ADABAS DBMS . In 1990, SAG produced the 4GL NATURAL. For the 4GL, CLIO was in advance.

4 IIn 1979 it was suggested to adopt Pascal for a rewritting. A Pascal had been developped in Nancy University for Solar computer, but Robert Morin thougth is was too risky (too early : BULL computers on GCOS will be equiped in C not until 1981, for ORACLE). At that time Pascal was emerging for VAX. However, the macro-generation technique has consumed a huge amount of amount of resources for further migrations. Later, choosing Pascal would have enabled an easy porting to C using translaters. Ressources would have better used, for instance toprepare SQL earlyer.

... And in 1986, the HARDIS Group launched a 4GL for AS400 and DB2 in Grenoble.

In 1984, a few friends (Christian Balmain, Dennis Vedda, ...) founded the IT services company HARDIS, which became HARDIS GROUP later.

Two years later, they introduced an IDE (integrated development environment) featuring a 4GL for IBM's AS400[5]. This product, ADELIA, captured 65% of the global AS400 market share and is still used by many customers today. Since then, HARDIS has successfully diversified and remains a gem among Grenoble's companies.

1983, at IMAG, MICROBE : a research project on R-DBMS ..

As part of a national project, an IMAG team (Gio Toan Nguyen, Fernando Fernandez, Yoon Joon Lee, Lounis Ferrat) developed the MICROBE prototype. This RDBMS-R, written in PASCAL, was using a high-performance relational tree processing technology in "pipeline" mode.

CNET, a french research Lab in Grenoble for Telecom authorities, was involved in an European research project (microelectronics for CAD VLSI). CNET had the leadership for data management . For this task, CNET has used MICROBE, through an agreement with IMAG. The CNET team has enhanced, industrialized MICROBE , and implemented CAD services on top of it. CAD needs revealed R-DBMS limitations in managing complex structures. This led to look for a balance between Object-Oriented DBMS (ODBMS) models, which emerged in the 90s, and an extension of the relational model, including concepts like surrogates and BLOBs.

CNET's efforts resulted in an international publication at DAC 86 in Las Vegas on advanced DBMS for CAD[6].

The 1990s

In the 1990s, the IMAG teams, led by Michel Adiba and Christine Collet, focused on DBMS concepts for multimedia and CAD. They worked on projects like TIGRE, FAKIR, and STORM, collaborating with manufacturers such as MATRA GIS and the Institute of Spoken Communication. They also explored medical applications and participated in European projects.

Their expertise was strong, and industrialists valued their contributions to real cases. IMAG played an active role in the GIP ALTAÏR efforts to produce the O2 DBMS.

The DBMS-OOs lose out to the benefit of the extended relational

Object-oriented DBMS like VERSANT, ONTOLOGIC, POET, and O2 could not gained traction against relational DBMS. Meanwhile, extended SQL(from extended relational model) was being added to ORACLE's products, which led the market. The SQL 99 standard has included these concepts.

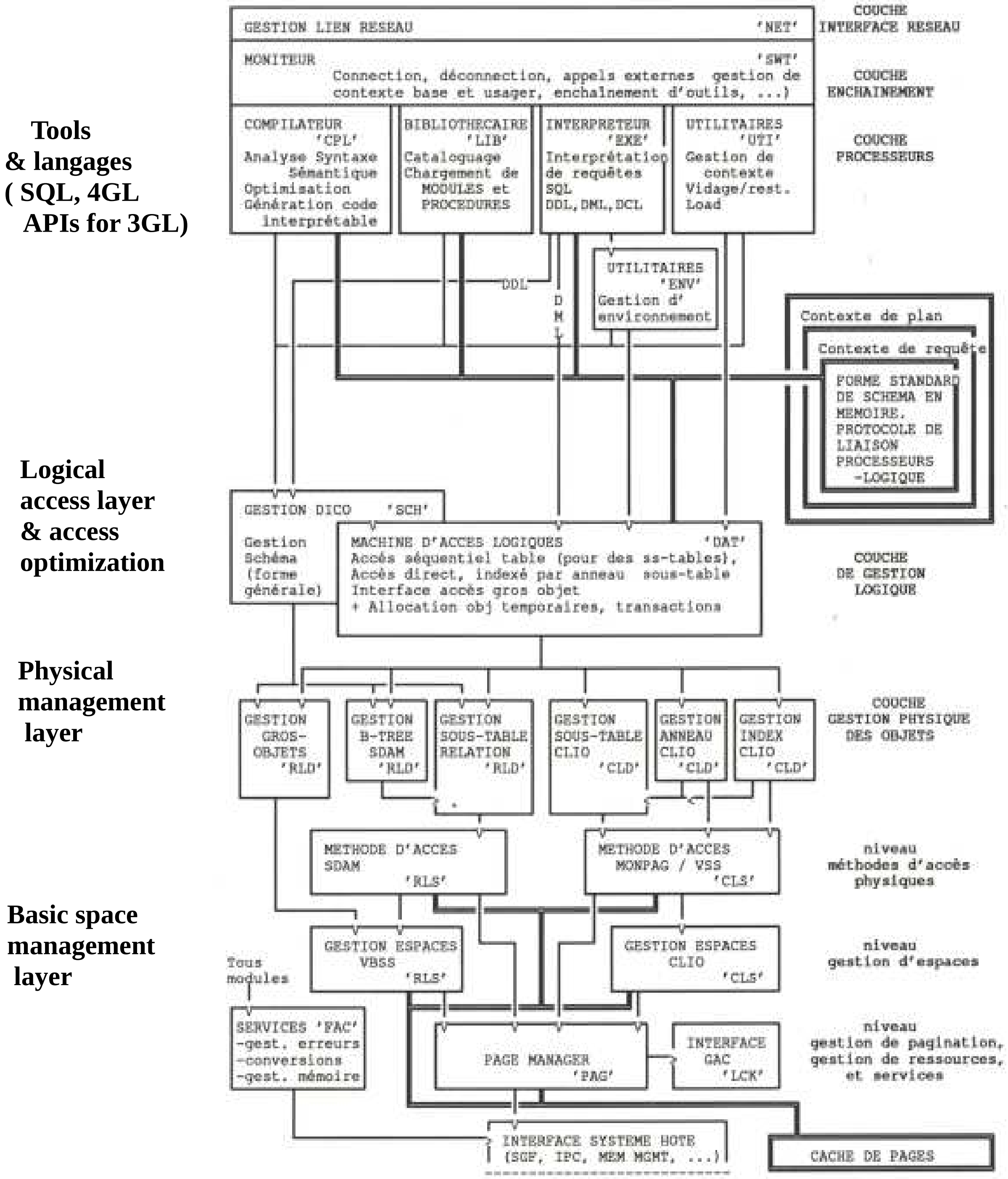
5 https://en.wikipedia.org/wiki/IBM_AS/400
6 https://dl.acm.org/doi/10.5555/318013.318157

THOMSON/SYSECA withdraws from the software edition

In 1990, SYSECA invested a lot in the MUST project. It was starting to show results, but it hasn't generated much sales.

For MUST, after trying to generate SQL with CLIO engine, it was decided to create a high-performance SQL . Drawing from CLIO's experience, SYSTEM-R (the team included JC. Favre wo had worked atIBM labs), ideas from MICROBE and new requirements (C.Jullien new both sides, CLIO and MICROBE), an industrial version of CLIO SQL emerged. It took 18 months and a dedicated team of 10 people.

The kernel of this DBMS was built in layers. First benchmarks on VAX revealed performances equivalent to ORACLE V6.

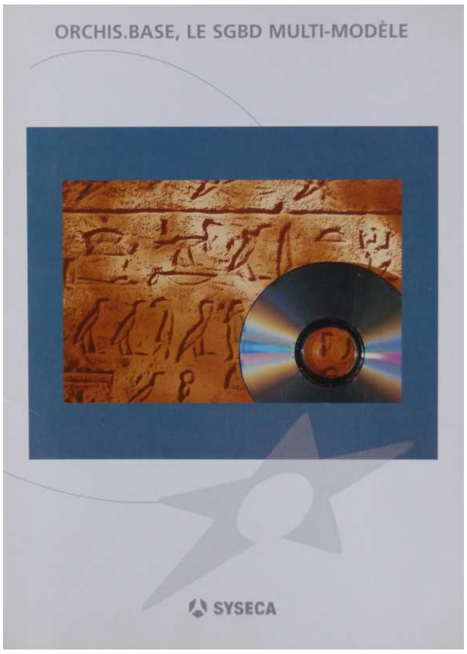


It handled different physical models. This included CLIO's data organization, complex objects, and an efficient addressing system with surrogates.

The SQL passed validation with the NIST[7] validation suite for SQL 92.

At the request of the Ministry of Industry, the Grenoble center worked also on industrializing the SABRINA[8] prototype DBMS from the SABRE project. Despite significant restructuring to make this system viable, the sale failed.

In 1991, major changes at SYSECA led to ending the MUST project and commercial efforts on CLIO. In Grenoble, the employee count dropped from 140 to 28 in just a few months, with a redundancy plan.



The residual team kept CLIO-SQL issued from the MUST project to meet customer needs and follow SQL standards.

Some customers switched to other products. However, large organizations like EDF, SNCF, and the French Gendarmerie needed long-term service.
They kept trust and financial support.

Communication efforts were made, and modern documentation was edited.

Called **ORCHIS-base**, the server was enhanced to provide interface to PC under MS-WINDOWS via the **Microsoft's ODBC[9] protocol.**

Since 1995, the rise of BIG DATA led to a **partnership with Business Objects** (acquired by SAP in 2008). This helped customers build datawarehouses.

At SEP Vernon (now SAFRAN), the kernel was ported on UNISYS mainframe to provide access to data used in the ARIANE project from PCs through ODBC.

In the USA, Thomson merged NOMAD and ALSYS into TSP (Thomson Software Products). This was later renamed AONIX and then ATEGO due to growth. In 2014, it was sold, ending THOMSON/BSI's publishing activities in the USA.

Until the last CLIO support engineer retired around 2015, THALES Services[10] in Grenoble handled maintenance of these software. After the 1991 decisions, most workers shifted to new jobs in the mid-1990s.

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7 https://www.nist.gov offers validation suites and services for software based on official standards.
8 https://pascal-francis.inist.fr/vibad/index.php?action=getRecordDetail&idt=8171718
9 https://learn.microsoft.com/en-us/sql/odbc/microsoft-open-database-connectivity-odbc?view=sql-server-ver17
10 In 2000, Thomson-CSF became the Thales group and SYSECA became Thales Information Systems (TIS or Thales-IS) until September 2005 when Thales IS became Thales Services and left its position as an IT services company for that of an industrial company with the concept of providing services

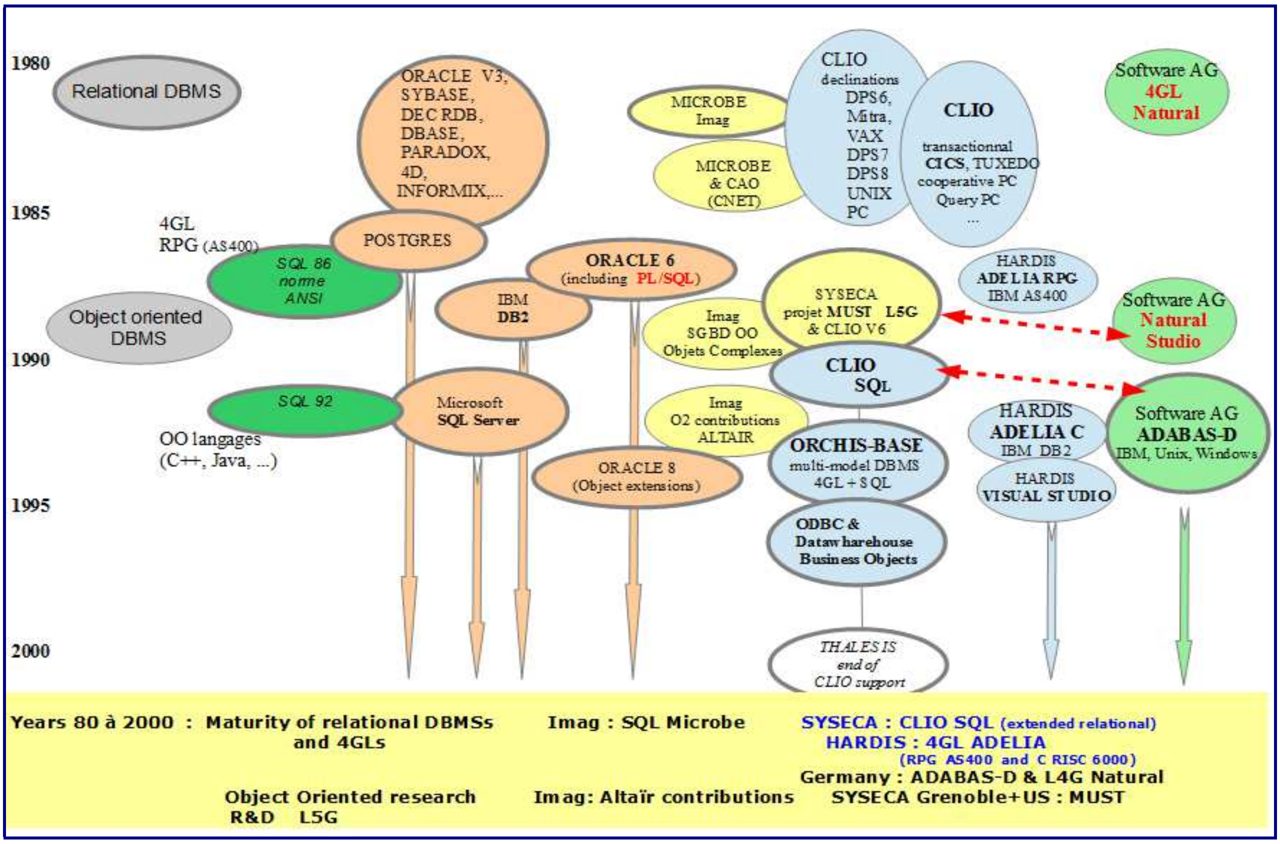
In Grenoble, HARDIS has enhanced ADELIA offering the generation of C programs for the RISC platform with DB2 under Unix. They also offered a VISUAL Studio workshop on PC. These services meet customer needs well. ADELIA is still part of HARDIS's product lineup.

HARDIS has branched into other sectors but remains strong in publishing. Its REFLEX logistics product leads in Europe. The group has seen steady growth since it was founded by the original creators.

In Germany, SAG have taken over work from TU-Berlin and Nixdorf on relational databases. SAG published an R-DBMS called ADABAS-D, included in their L5G NATURAL offer. *Looks like strategy adopted for MUST project !*

SAP[11] baught this RDBMS from SAG in 1997, and, after enhancements it became SAP-DB, releasing the source code under the GNU Gneral Public Licence in October 2000. In 2003, SAP and MYSQL-AB rebranded the DBMS in MaxDB.

SAG continues to market both ADABAS and NATURAL.
As a software publisher, SAG has expanded into web integration and data management. Today, SAG is one of the largest software companies, leading in Germany.



DBMSs in 2025 ..

RDBMSs currently in use: ORACLE, DB2, MS-SQL Server, SAP HANA, and more.
Open source options include: MySQL, MariaDB, Postgres, etc.
Some applications still run on: MS-ACCESS or LibreOffice Base.

11 https://en.wikipedia.org/wiki/SAP

Following NOSQL[12] concepts, new trends and products address emerging needs:

- Distributed databases for cloud: Amazon Aurora, Google Cloud Spanner, Azure Cosmos DB
- Multi-model databases: ArangoDB, OrientDB, Couchbase
- Edge and IoT database solutions: InfluxDB, Apache Cassandra, SQLite

In 1992, Orchis-Base was part of the multi-model database landscape.

Did Grenoble hold the keys to BIG DATA?

Grenoble has a strong public research base and solid partnerships with firms.
For data management software, this has helped to reach an excellence level . As a result, it has created economic value through various applications for many customers in France.

However, DBMS french market was not enough to survive against major American and Asian tech firms. With industrial alliances in Europe, Grenoble could have probably remained a player in DBMS software publishing.

Contrary to the AIRBUS alliance, France has abandonned the UNIDATA[13] project. This was a turning point and made Europe lost a chance to control its market for BIG DATA. THOMSON backed UNIDATA, and its DBMS, SOCRATE/CLIO, was the only widely marketed product in France. It could have played a leadership for data management   in an alliance with other German companies specialized on the field.

Researchers in Grenoble have maintained strong potential in this area. It remains a hub for innovative ideas in information management. Despite their conceptual strength, French research efforts (like MICROBE, SABRE, SABRINA, O2) have lacked the support needed for industry transfer.

SYSECA, renamed THALES IS, has shifted focus to cloud security services. The Grenoble center, after significant staff cuts in 1992, has survived and has much more employees than in 1990.

HARDIS GROUP have adapted without losing their achievements (like SOFTWARE AG in germany). In 2025, the company has offices in 8 countries in Europe in a constant growing..

A European Challenge: Protecting Our Freedom with Regulations

Since the 90s, data management has evolved beyond DBMS. Languages like 4GL and organizational software such as ERPs have enhanced productivity. Web technologies now play a crucial role.

European companies like SAP, SAGE, and DASSAULT have gained a global foothold. Their success shows that clear strategies can thrive in Europe’s publishing sector.

Today’s challenges extend beyond databases, languages, and ERPs. They include web technologies, especially web indexing, data exploitation, data mining, artificial intelligence, cybersecurity, and cloud/SaaS. These fields are strategic and européan authorities now understand the need of independance.

To protect Europeans, the Digital Services Act (DSA) now regulates the activities of platforms, in particular those of GAFAM. It has been fully applicable since 17 February 2024.
In 2025, the EUSP joint venture between Qwant and Ecosia aims to create a European search engine. This project seeks to enhance digital sovereignty and privacy for European users. Will those users support these initiatives for their freedom, or will they again favor American and Chinese economies?

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12 www.christof-strauch.de/nosqldbs.pdf
13 https://ehne.fr/en/encyclopedia/themes/material-civilization/digital-europe/unidata-or-european-it-misunderstanding