

**RAISE Team**  
**RESEARCH**

- 1. CONCEPT ..... 3**
- 2. PROJECTS ..... 4**
- 3. PUBLICATIONS ..... 5**
- 4. CONTACTS..... 6**

---

## 1. Concept

Intensive research conducted by the RAISE Team has been extremely effective over years. Resting on the strong belief that no stable evolution is possible without continuous research in the field Team's innovative approach gave rise to successful migration of research projects to commercial undertakings and putting research results to use in Team's internal manufacturing process. Below follows the outline of the Team's main research streamlines:

### **Corporate information systems integrated design tools.**

The Sphere CASE technology continuous improvement and search for alternative approach has been subject matter for this trend.

Online analytical processing and intellectual decision support tools (OLAP / DSS) exploiting expert and semantic data analysis system mechanisms are in design. The latter would provide for qualitatively higher usability level of system's functionality as customer would have instruments for optimal manufacturing process management and strategy planning at his disposal. These are also planned to involve in information system manufacturing for discovering and tracking system evolution trends saving them for future use.

Data protection tools for corporate data banks and warehouses are in design. Formal description of access rules for separate data elements / sets of various aggregation levels and dynamic alteration of these for individual users / groups based on access history are accentuated as the context-sensitive access control mechanisms are of special concern in this topic. These means would guarantee additional flexibility to those provided by conventional database server facilities.

### **Distributed intellectual data storage and retrieval systems.**

Software cooperative multi-agent systems used for retrieval and processing data from diverse sources are subject to this trend.

Mechanisms of semantic data search, intellectual retrieval and ontology building studied would allow for best possible utilization of corporate system network and computational resources. The other point here is providing ability to automatically control state of many dynamically changing data sources (data warehouse automatic population, situation modeling, evolution forecasting, etc.). Self-programming methods used for self-optimizing data storage and retrieval system design are of special concern in this topic.

---

---

## 2. Projects

### **Interface standardization for Metalogic Interpreter and Model Interpreter engines.**

Formal description techniques and notations (UML, ERD, XML, etc.) are studied in the light of usability in the Sphere CASE technology, further improvement prospects and overall commercial appeal. At the same time principles of mapping parameterized program solution system (PPSS) objects and parameterized configuration solution system (PCSS) objects into the above formal notations are sought. This would pose a unified foundation for analysing different sets of PPSS / PCSS in regard to their usability and ultimately refining usability common criteria for these systems. GUI design issues for Metalogic Interpreter and Model Interpreter are also considered.

### **Design of performance evaluation techniques for integrated CASE-tools.**

Unified approach to quantitative performance evaluation of integrated CASE-tools is subject to investigation. There is an easily scalable test task defined in the project to be realized with every tool tested and time / labour resource expenditures for each development phase calculated. Besides that distinctive features of specific tools making them treat development process in different manner (e.g. different development phase sets, different operation sets, different phase / operation status, etc.) are considered. This provides for formalized procedure of performance evaluation for integrated CASE-tools from different vendors without regard to their technological implementation.

### **New technology for interaction of object and relational data / functionality presentation models.**

Reciprocal data mapping methods within object and relational models are subject to investigation. The latter would benefit from both parent models allowing for their basic features synergism. Solutions for SQL-query analysis, optimization and generation while taking into consideration factors like database information structure, data population and DBMS implementation-specific issues are under construction. So are configurable mechanisms of mapping relational data into object models to optimize traffic between client and server. Mechanisms of local and distributed data caching are also regarded in a view of object and relational model interaction.

### **Intellectual agent for network monitoring software system.**

Mobile software agent is designed as a basic building block for decentralised network monitoring system in the project. The system itself is a population of intellectual agents where any specimen is able to become an acting manager and provide all information gathered by the rest of agent community if asked by user. Agent community can move across network and alter its population subject to different conditions. The idea is to find the optimal algorithms for agent interaction which would allow retrieving maximum of data at less possible network and computational resource expense. The differences in the above algorithms for different classes of data sought (e.g. data found at different OSI model layers) is stressed upon in the project.

---

---

### 3. Publications

#### **Corporate information system (CIS) design automation: approaches and evolution prospects.**

Information system design process is under investigation from standpoint of system architect. The main idea is that restricting the scope and standardizing task classes targeted by CIS results in best design automation. Stages of CIS design technology evolution are considered in the light of experience progressively accumulated and encapsulated in design patterns (parameterized program solution systems) and modeling patterns (parameterized configuration solution systems). Concluding is the challenge issue to quantify effectiveness of different CIS design approaches basing on common evaluation test project.

#### **Analytical study for ERP-systems: configurability, scalability, expandability, functional completeness.**

ERP-class system features like configurability, scalability, expandability and functional completeness are investigated in the article from standpoint of system developer regarding CASE-tools which are integrated in the system. Generalized abstract object model of ERP-system is developed to demonstrate interdependence of the above features. Over fifty systems of different scale and price level are studied in the view of the above model with common classifier produced over the range of several basic qualifiers. Comparative analysis of the ERP-systems studied is performed in bounds of each qualification group.

#### **Analytical study for document management systems: flexibility and scalability.**

Document management system flexibility and scalability features are investigated in the article in the light of system operation effectiveness. Definition for the above features reflecting authors' standpoint in the matter and generalized object model demonstrating their interdependence are given. Ten systems from leading vendors are studied in the view of the given model. Data security issues and their correlation with these of flexibility and scalability are also attended.

---

#### 4. Contacts

