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Integrirani informacijski sistem SOCRATES
Integrated Information System SOCRATES

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0. UVOD

Integrirani informacijski sistem SOCRATES[1] ustreza sodobnim razvojnim tendencam informacijskih sistemov v okoljih prilagojenega dajanja informacij. Običajni postopek razvoja od vrha navzdol je zamenjan z razvojem od spodaj navzgor, ki strne operacije na sodelovanje med uporabnikom in ponudnikom tako, da se razvije v sistem za hitro in prilagojeno dajanje informacij in dokumentov ter poklicno reševanje problemov.

1. CILJI RAZVOJA SISTEMA SOCRATES

Razvoj knjižničnih, dokumentalističnih, raziskovalnih in razvojnih dejavnosti na eni strani in problemi uporabnikov na drugi strani ter razvoj informatike, računalništva in telekomunikacij na tretji strani so pripeljali do naslednjih strateških razvojnih ciljev:

— združevanja v vedno višje integracijske strukture in strnjevanje informacijskih procesov CIM (Computer Integrated Manufacturing);

— telekomunikacijskega povezovanja različnih informacijskih sistemov (standardizacija komunikacij in informacijskih sistemov) v protokolih MAP (Manufacturing Automation Protocol), TOP (Technical Office Protocol), EDIFACT (Electronic Data Interexchange For Administration, Commerce and Transport);

— uporabe metod, ki omogočajo spremenljivo prilagajanje vedno večjim lastnim in zunanjim potrebam;

— uporabe vedno bolj zapletenih tehnik umetne inteligence na področju odkrivanja napak, prilagajanja, odločanja in ukrepanja;

— zagotavljanja kakovosti, razpoložljivosti, zanesljivosti in varnosti delovanja;

— avtomatizacije procesov;

— povečevanja avtonomije, lastne odgovornosti, nadzora, prilagodljivosti internih procesov in osebkov v avtonomnih enotah s funkcionalno strukturiranimi izdelki in storitvami;

— povečevanja pretoka informacij v avtonomnih modulno organiziranih enotah.

1.1 Operativni cilji

— skupno reševanje uporabnikovih problemov,
— postopna funkcijska rast lastnega sistema,
— sodelovanje z drugimi sistemi,
— povečanje dinamike razvoja,
— zmanjševanje skupnih tveganj.

0. INTRODUCTION

An integrated information system has been developed, meeting demands of modern trends in the system design in the just-in-time environment. The usual top-to-down development procedure was changed into a down-to-top procedure, which centres the operations on cooperation between the user and professional workers of information systems to meet the users' demands for fast and accurate information and document delivery.

1. OBJECTIVES

In order to integrate the activities of libraries and documentation centres, research and development activities on the one hand, and the problems of users on the other, together with the development of informatics, computing and telecommunications, a global system was developed with following strategic objectives:

— Integration of structures and processes into ever higher integrated information structures and integrated information processes CIM;

— the joining of different information systems with telecommunications (standardization of communications and information systems) in such information protocols as MAP, TOP, EDIFACT;

— the use of such methods as to make possible flexible adaptation to growing own and other demands;

— the use of more and more sophisticated, artificial intelligence in the fields of failures diagnostics, system adaption, decision making and utilization;

— a high level of the quality assurance, availability, reliability, safety, and credibility;

— full computerization of processes;

— to increase the autonomy, self-responsibility, autocontrol and adaptation as internal processes in autonome units in functionally structured information services;

—to increase the flow of information in the modular organized autonomous units.

1.1 Operational aims

— solving of user's problems,
— succesive functional growth of own system,
— cooperation with other systems,
— increase of the development dynamics,
— decrease of common hazards.

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[1] Specialized Organisation Communication, Research & Development, Automation, Texturing and Evaluation System

1.2 Nadzorovane lastnosti

Neznanje, površnost, nasprotnost, neracionalnost, nesmiselnost, nesmotrnost, nekoristnost.

1.3 Možnosti

Možnosti za razvoj so bile v zadnjih desetih letih neprenehoma spremljane, posebno na področjih kooperativnega dela z uporabniki in družabniki v informacijskem sistemu, skupinskega dela in proizvodne filozofije (vodenje procesov).

Celoviti informacijski sistem SOCRATES je zasnovan kot multikooperativni, objektno v treh ravneh (podsistem, sistem, nadsistem), petstopenjski način delovanja (statistična, semantična, sintaktična, pragmatična[1] in apobetična[2] stopnja), petlupinski (funkcionalna, motivacijska, organizacijska, informacijska in poslovna lupina), ki delujejo na primitivni ravni in z nad njim delujočimi kompleksnimi, celično delujočimi povezovalnimi načeli:

— procesi so funkcijsko urejeni;

— funkcijsko urejeni procesi so strnjeni v celovit sistem;

— zaščitna ovojnica (opna) loči zunanje procese (dogodke okolja) od notranjih;

— celovit sistem sestoji iz notranjih, zunanjih in zaščitnih postopkov, ki delujejo kot dinamično uravnotežena, neločljiva celota (podsistem v celici, celica v svojem okolju).

1.2. Controlled attributes

Ignorance, shallowness, nonrationality, paradoxicality, absurdity, aimlessness, uselessness.

1.3. Possibilities

Possibilities have been recognized by research and experimental work during the last ten years, especially in the fields of multidisciplinary, co-operative, team-work conditions.

The global system SOCRATES was theoretically designed in the following way as cellular systems, as a multicoordinate, three-objective-level (subsystem, system, supersystem), five-step-level (statistic, semantic, syntactic, pragmatic and apobetic level), five-shell (functional, motivative, organizative, informative, and economic) model, which operates on the simple and on the above arranged complex levels:

— processes are arranged functionally;

— functional processes are integrated into a global system;

— a protection envelope separates the external (environmetal) processes from the internal processes;

— the global system consists of the internal, protection and external processes, working as a dynamically balanced inseparable entirety (the cell in its environment, the system in the supersystem).
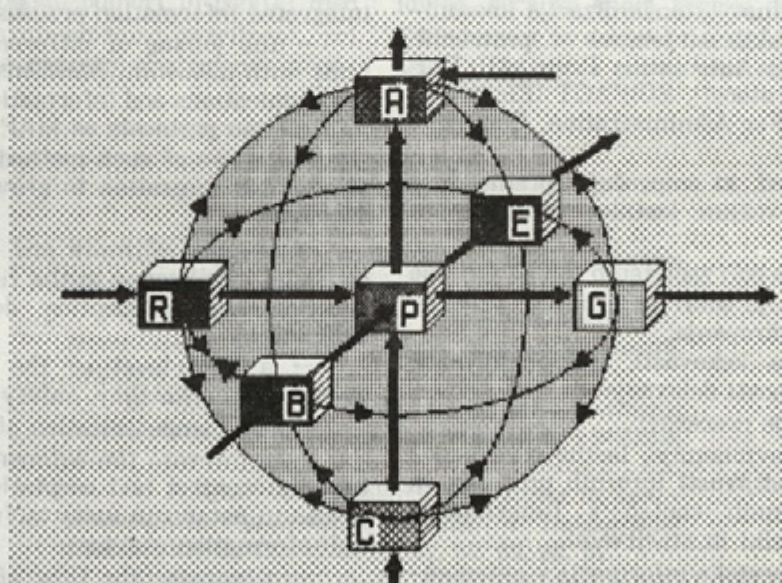
Sl. 1. *Informcijski sistem.*
A — adaptacija, B — osnove, vzroki, začetki, C — nadzor, E — učinki, posledice,
G — cilji, rezultati, tarče, ponori, P — procesi, R — izvori, viri

Fig. 1. *The celular information system.*
A — adaption, B — base, possilities, initiation, C — control, E — effects, consequences,
G — goals, results targets, sinks, P — processes, R — sources, resources

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[1] stvarna, strokovna

[2] smiselna, namenska, vzroki←→posledice, učinki (glej: ISO 7498: Information Processing Systems; Open Systems Interconnection 1984)

1.4 Splošne zahteve

Sistem je grajen modulno tako, da ga je mogoče širiti na več načinov:
— neomejeno glede na število podatkov v bazi:
— majhne omejitve po številu polj v zapisu (do 500 polj):
— omejitve dolžine celotnega zapisa na 1600 znakov, kar je mogoče povečati v posebnih primerih.

Cilji morajo biti doseženi v naslednjih sistemskih stopnjah:

1.4.1 *Sistemska stopnja 1 — posamezna delovna postaja*

Je specializirana za različne vrste standardnih del na področju knjižnic, dokumentacijskih centrov, arhivov, raziskovalnih in razvojnih nalog ter omogoča osebi, ki tako delovno postajo uporablja, profesionalne delovne razmere.

1.4.2 *Sistemska stopnja 2 — informacijska celica*

Strniti mora delovanje delovnih postaj, jih med seboj povezati v celoto in družiti tudi specifične strokovnjake v delovno skupino, ki deluje kot sistem v treh smereh:
— vodoravno v procesne verige od porajanja ideje, iskanja virov (predvsem informacij), raziskav, razvoja, načrtovanja proizvodnje, razdeljevanja in uporabe izdelkov ter servisiranja, do razgradnje izdelkov in obnavljanje virov;
— vodoravno v strokovne procese s povezovanjem procesov enake narave, (npr. raziskovalno dejavnost v multidisciplinarne skupine, ki delujejo kot informacijski izvedenci);
— navpično v hierarhično strnjene funkcionalne lupine, ki opravljajo primarne funkcije, motivacije teh funkcij, organizacijo, informatizacijo in gospodarske dejavnosti.

To stopnjo sestavlja najmanj ena delovna postaja, vendar jih je navadno 5 do 7 in jih povezuje lokalna mreža za prenos podatkov LAN (Local Area Network).

1.4.3 *Sistemska stopnja 3 — gospodarsko neodvisne skupine, podjetja, inštitucije, itd.*

To so npr. knjižnice, dokumentacijski centri, arhivi, raziskovalne inštitucije itd.

Ta sistemska stopnja je sestavljena najmanj iz dveh delovnih postaj, organizirana v najmanj dve informacijski celici, ki jih med seboj povezuje podjetniška mreža za prenos podatkov MAN (Middle Area Network), vendar lahko deluje na razširjeni celični ravni (na lokalni mreži za prenos podatkov).

1.4. General utilization solutions

The system is built in a modular approach in order to be expandable in various ways:
— no limitations with respect to the number of data base notations,
— low limitations with respect to the number of field data (up to 500 fields),
— limitation of the total length to 1600 items, to be increased only in special cases.

These objectives are achieved in the folowing steps:

1.4.1. *System step 1 — individual work station*

This must be specialized for various kinds of standard work in the field of libraries, documentation centres, archives, research, and development activities, thus providing the person which operates the work station, professional working conditions.

1.4.2. *Systen step 2 — information cell.*

It must integrate the operations of work stations and has to chain the specific professions into the whole system, which operates in three ways:
— horizontally in the process chains from the idea of resources (especially information), research, development, production planning, distribution, implementation and servicing of products, to the decommissioning and recycling of secondary resources;
— horizontally in the background processes, linking them if they are of the same nature (e.g. research activities in the multidisciplinary teams, operating as information experts);
— vertically in the hierarchically integrated functional shells, executing primary functions, motivation, organization, information and economic activities.

This step consists at least of one work station, but usually of five to seven, which are bound together with a local area network (LAN).

1.4.3. *System step 3 — economically independent groups, enterprises, institutions, etc.*

These are libraries, documentation centres, archives, research institutions, etc.

This step consists at least of two work stations, organized into two or more cells which are bound together with a middle area network MAN, but it can also operate on the extended cellular level (on the local communications level).

1.4.4 Sistemska stopnja 4 — neodvisni branžni informacijski sistemi, združenja itd.

To so npr. kovinsko-predelovalna, avtomobilska, elektronska industrija, itn.; združenje strojnih, elektrotehniških inženirjev itn.

Ta stopnja je sestavljena iz ponudniškega (host) sistema, ki deluje na ravni telekomunikacijske mreže za prenos podatkov WAN (Wide Area Network) npr.: JUPAK, DATEX—P itn., ali kot zasebne telekomunikacijske mreže (npr. DECNET).

1.4.5 Sistemska stopnja 5 — državne in meddržavne aktivnosti

So odvisne od organizacijskih prizadevanj na področju standardizacije, zakonodaje, priporočil, projektov itd.

2. POSAMEZNE DELOVNE POSTAJE

Na ravni posameznih delovnih postaj so razvite in strnjene naslednje specifične aktivnosti:
— delovna postaja za vnos podatkov, ki ima razvite tri značilne stopnje delovanja:
  * vnos besedila in grafike (statistična raven)
  * indeksiranje in sistemsko odvisne operacije (semantična raven),
  * višje ravni operacij: nadzorne in prilagoditvene operacije (sintaktična raven);
— kompozicija in dekompozicija);
— delovna postaja za ponovno pridobivanje informacij, kjer so značilne štiri ravni zahtevnosti:
  * pridobivanje bibliografskih podatkov,
  * informacijsko posredništvo,
  * reševanje problemov (svetovalci),
  * informacijske analize in sinteze, izvedeništvo itn.;
— administrativna delovna postaja (pridobivanje in oskrba z informacijami);
— delovna postaja za raziskave in razvoj.

Vsi ti tipi delovnih postaj so oskrbljeni z enotno računalniško in programsko opremo. Delovne postaje so opremljene z mikroračunalniki s procesorji MC 68000 ali 80386, pri čemer obstaja želja po spremembi na procesorje 386 in 486.

Osnovna programska oprema je doma razviti programski paket STEVE (ST EVent Editor - sistem za urejanje besedil, slik in podatkovnih baz) izveden v več različicah in prilagojen več stopnjam razvoja in obsega okoli 560 ukazov.

Razvojna programska oprema je SOCRATES, ki obsega informacijske strategije, razvojne sisteme in dodatne sistemske operacije, oblikovan kot odprt sistem, ki ima ukaze integrirane v štiri module (vnos podatkov, izdajanje podatkov, ekspertni in administrativni modul).

1.4.4. System step 4 — Independent branch Information systems, societies, etc.

These are the metal working, automotive, electronic industries, etc.; societies of mechanical, electronic engineers, etc.

This step consists of a host system operating on a wide area network (WAN), utilized as a public network system (JUPAK, DATEX—P, etc.) or as private communication network systems (e.g. DECNET).

1.4.5. System step 5 — national and international cooperation,

Depending on the organization activities, is standardization, regulation, recommendations, projects, etc.

2. INDIVIDUAL WORK STATIONS

At the stage of individual work stations, the following specific operation cycles, together with specific professions, were developed:
— data entry station, where three levels are significant:
  * text and picture data entry (statistical level),
  * indexing and system dependant operations (semantic level),
  * higher level operations: control and adaptative operations (syntactic level)
— composition and decomposition);
— data retrieval stations, where four levels are significant:
  * bibliographic data delivery,
  * information dealer,
  * problem solving broker,
  * information expert level, etc.;
— administration data systems operations (consumers and suppliers);
— research and development work station.

All these types of work stations are supplied with unified hardware and software. Work stations are equipped by PC systems with MC6800 or 80386 processors, tending to change to 386 and 486 processors.

The system software is a a self developed system named STEVE (ST EVent Editor - database, text and picture editor system), made up of several options and adapted to several levels of development, consisting of some 560 functions.

The applications software is the system SOCRATES, consisting of information strategies, development systems and additional system operations, designed as an open system, having functions integrated in four modules (data input and acqusition, expert and administrative modules).

2.1 Modul za vnos podatkov

Ta modul lahko deluje s svojimi notranjimi (RAM) in zunanjimi pomnilniki (trdimi in gibkimi diski), priključen je na LAN in tako na celični računalniški sistem in prek tega na podjetniške in javne mreže za prenos podatkov. Tako lahko prenaša podatke iz višjih sistemskih stopenj in nanje.

Funkcionalne povezave:

— na celični mikroračunalniški sistem 386/33, ki upravlja lokalno mrežo za prenos podatkov in celični informacijski sistem ter omogoča delovanje višjih funkcij integriranega informacijskega sistema: nadzora in prilagoditve podatkovnih baz, razvojnih funkcij, pragmatičnih in apobetičnih funkcijskih lupin, integracijo v okolje in komuniciranje z okoljem ter aktivnosti gospodarske lupine;

— vmesnik na širši knjižnični informacijski sistem COBISS, kjer so shranjeni in dostopni centralni katalogi;

— povezave z branžnim informacijskim sistemom, kjer so dostopne kooperativno grajene podatkovne baze predvsem poslovne narave;

— povezave z mednarodnim ponudniškim sistemom (DATASTAR, FIZ TECHNIK itn.), kjer so dostopne kooperativno in centralno grajene podatkovne baze.

Operacije v tem modulu (kakor tudi v drugih) se opravljajo v okolju sistema SOCRATES (celotno okolje z lokalnimi cilji, neposrednim nadzorom in prilagoditvami , simuliranjem vzrokov in posledic, motivacijskimi, indukcijskimi in dušilnimi učinki).

Lokalne nadzorne in prilagoditvene funkcije so:

— uporaba različnih formatov, oblikovanih kot maske monitorjev, prilagojenih različnim informacijskim potrebam za različne ciljne informacijske sisteme, različnim tipom vhodnih dokumentov ali računalniško pripravljenih informacij in raznim vnaprej določenim informacijskim virom;

— uporaba pregledov nadzorovanih pojmov in poimenovanje teh pojmov, ki jih operater na delovni postaji (dokumentalist, informatik) lahko razširi s predlaganimi novimi pojmi, ki jih morajo sprejeti nadrejene nadzorne stopnje (celična raven) in nato izdati nov pregled nadzorovanih pojmov;

— uporabo pravil konsistence sistema SOCRATES, ki se dopolnjujejo vzporedno s preverjanimi pojmi;

— uporabo pregleda internih okrajšav;

— uporabo pregleda splošno uveljavljenih okrajšav;

— uporabo strokovnega klasifikacijskega ključa (s prej omenjenimi operacijami se preverja in prilagaja semantična raven);

— uporaba gibko prilagodljivih sistemov, ki omogočajo spremembe podatkov in njihove povezave glede na različne ciljne sisteme (sintaktični urejevalnik);

2.1. Data input module

This module can operate with its own internal (RAM) and external memories (hard and floppy disks), with LAN and its mainframe computer, and over LAN with MAN or WAN communications to transfer the data on/off one of the higher levels.

The following connections are available:

— cellular microcomputer 386/33 system, driving the LAN and the cellular integrated information system, performing higher level operations as: control and adaptation of databases, development functions, pragmatic and apobetic functions of the system, environment integration and communication, and economic shell activities;

— over this system, a connection to the library system COBISS, where the central library files are served;

— connections to the branch host system, where the cooperative built databases of the information system are served;

— connections to international host systems (DATASTAR, FIZ TECHNIK, etc.), where the cooperative built databases are located.

The operations in this module (as well as in all others) are executed in the SOCRATES environment (global system environment with local and global targets, direct control and adaptation, cause and consequence simulations, motivation induction and damping effects).

The local control and adaptation functions are:

— the implementation of various formats realized as display masks, adapted to various data entry needs for various target information systems, various types of documents or electronically generated information, and various predefined information sources;

— the implementation of the updated list of controlled terms, which can be extended by the operator with proposed new controlled terms, which have to be accepted by the supercontrol step, which gives a new, adapted list of controlled terms;

— the implementation of the SOCRATES consistence rules, which can be also extended in a similar way as the controlled terms;

— the implementation of standard interpretations on the list of internal abbreviations;

— the implementation of standard interpretations on the list of commonly known abbreviations (acronyms);

— the implementation of classification list with classes and interpretations; (in the above mentioned operations, semantics in controlled and adapted);

— the implementation of arrangement systems enabling the alternation of data on various given target systems (syntaxis editor);

— uporaba operacijskih verig, (pregled pomembnih, preskušenih verig ukazov za različne želene izdelke ali funkcije).

Tako se izvaja pragmatična stopnja, apobetična raven v tem modulu ni pomembna.

Lokalne funkcije delovne postaje se v ozadju upravljajo z uporabo lokalnega nadzornega sistema, ki preverja porabo virov, nadzira naročila (potrebe uprabnikov).

2.2 Modul ponovnega pridobivanja informacij

Modul ponovnega pridobivanja informacij je prilagojen izvajanju naslednjih funkcij:

— pridobivanju podatkov z lokalno hranjenih podatkovnih baz,

— pridobivanju podatkov prek neposredno računalniško povezanih informacijskih in ponudniških sistemov;

— pripravi podatkov za predstavitev uporabnikom;

— analizi informacij glede na zahtevane in/ali operaterjevih izbranih strategij;

— izvajanju internih nadzornih postopkov in postopkov prilagajanja.

Te ciljne funkcije so specializirane glede na različna okolja delovanja:

— na delovanje v knjižnicah, kjer se lahko odgovarja na preprosta vprašanja (npr.: »Ali imate kaj o ...«) in se potem postopek navadno obrne k izposoji primarnih dokumentov in ustreznim informacijskim sistemom;

— na informacijskega posrednika, kjer se rešujejo preprosti problemi, vendar se zahtevajo prek računalnika pridobljene informacije na domačih in tujih ponudnikih, kjer se odgovarja na vprašanja: »Ali je mogoče dobiti kakšen dokument o ...« (uporablja se specialna strokovna terminologija, vprašanja so skladna):

— na informacijskega svetovalca, kjer se rešujejo kompleksni problemi, prevladujejo zahteve po vzajemnem znanju o problemih in ti ne morejo biti natančno določeni. Problemi morajo biti določeni na več načinov, tako da dobimo spekter odgovorov, ki imajo običajno nasprotujoč si pomen in/ali protislovne izjave (pragmatično delovanje);

— na informacijske izvedence, kjer se kompleksni odgovori analizirajo in sintetizirajo, kjer se naredi dekompozicija podanih struktur in ponovne mogoče kompozicije struktur, kjer se informacije vrednotijo na možne vzroke in posledice itn.; kjer se uporabljajo izvedenske metode in orodja, kjer so mnenja končen rezultat, kjer je potrebno sodelovanje dveh ali več izvedencev, osebno znanje in izkušnje, kjer se morajo uporabljati posebne analitične metode in kjer odigra profesionalni kodeks etike prevladujočo vlogo (apobetično delovanje).

Lokalne funkcije nadzora in prilagajanja so:

— uporaba različnih izhodnih dokumentov v obliki mask na monitorjih ali formularjih, pri-

— the implementation of operation chains (list of significant operation chains, composed of proven operation compositions).

The pragmatic level is executed in this way. The apobetic level in this module is not significant.

The local functions of the work station are in the background managed by the local control system, which controls the consumption of resources, controls the orders (information needs) of the users.

2.2. Data retrieval module

This module is adapted to execute the following target functions:

— to get data from the internally loaded databases,

— to get data from the online information retrieval systems and hosts,

— to prepare the data for presentation to the user,

— to analyse the data with regard to the given and/or by the operator chosen strategies,

— to execute the internal control and adaptation procedures.

These target functions are specialized for various functional environments:

— library conditions, where one simple question has to be answered (like: »Have you anything about ...«), and the process afterwards goes usually to the primary document lending and to associate information systems;

— information dealer conditions, where simple problem solving conditions predominate but online retrieval on domestic and foreign hosts has to be performed, where answers like: »Is it possible to get some documents on .... (special professional terminology is used, the questions are consistent);

— information broker conditions, where complex problem solving conditions with cooperative knowledge about the problem is the dominant factor and the problem is not exactly defined. It has to be defined in several modes to get a field of answers with controversial and paradoxal declarations (pragmatic level);

— information expert conditions, where the complex answers are analysed and synthetised, the given structures are decomposed, new possible structures are composed, the information is evaluated for possible effects, causality etc.; where expert methods and tools are used, where expertise is the end result, and where the cooperation of two or more experts in the multidisciplinary field of solutions with a high degree of personal knowledge and experience is needed, where specialized information analysis methods are implemented, and where the professional code of ethics has a dominant role (apobetic level).

Local control and adaptation functions are:

— the implementation of various answer forms, realized as display and printing forms,

lagojenih raznim izhodnim protokolom, potrebam uporabnikov in ciljnim funkcijam, prilagojeni posebnim procesom;

— uporaba različnih zbirk preverjenih pojmov, strokovne klasifikacije, standardnih in lokalnih okrajšav (akronimov) itn., za predstavitev in razlago podatkov, ki jih operater lahko prilagodi posebnim zahtevam ali pogojem;

— uporaba konsistenčnih pravil sistema SOCRATES, ki jih je mogoče tudi prilagoditi posebnim zahtevam (razširiti) glede na primerjavo skladnosti, doslednosti, zložljivosti, ujemanja, primernosti globalnih odgovorov (klasifikacija) in specifičnih odgovorov (preverjenimi pojmi);

— uporaba standardnih informacijskih izdelkov, ki jih lahko izvedemo s preprostimi postopki (»pritisni na tipko«), kjer so specifični podprocesi združeni v verige ukazov (v neodvisno funkcionalno celoto) in pomenijo skupke procesov s specifičnim rezultatom in se skupina takih »pritiskov na tipko« uporabi za izdelavo končnega informacijskega izdelka;

— uporaba standardnih strategij, kjer se verige ukazov združujejo v sklenjene člene, ki jih je mogoče uporabljati za skupine informacijskih izdelkov in so prilagojeni določenim potrebam posameznih podatkovnih baz ali skupini teh baz (strokovnih informacijskih sistemov), ki se rešujejo kot problemski vzorci;

— uporaba metod informacijskih analiz in strategij za reševanje problemov z namenom optimirati informacijske mreže in izdelati odločitve kot optimalne odgovore;

— avtomatizacija in informatizacija izvedeniškega dela in postopkov, kjer niso potrebne odločitve;

— pridobivanje podatkov, ki jih uporabljajo drugi deli strnjenega sistema, drugi moduli istega sistema in s katerimi se razvija v sistem SOCRATES.

Tako se izvajata pragmatična in apobetična funkcionalna raven. Apobetična raven postaja tako najpomembnejša in je s preostalimi moduli namenjena celotnemu sistemu SOCRATES v apobetični funkciji, hkrati pa drugim modulom kot dobavitelj podatkov za njihov nadaljnji razvoj in kot pripomoček za raziskave in vodenje (prilagoditev) celotnega sistema in/ali posameznih modulov.

Delovanje lokalne funkcije delovnih postaj za ponovno pridobivanje informacij nadzira v ozadju kontrolni podsistem, ki nadzira porabo virov, potek naročil (informacijske potrebe uporabnikov), ustvarja kontrolne podatke za lokalni in globalni sistem, daje podatke za prilagoditev sistema naročil in izbiro primarnih dokumentov, skupaj s celotnim vhodnim modulom, daje podatke za pospeševanje ali zaviranje (dušenje) glede na celotne pretočne čase in posamezne udeležence v posameznih delnih procesih (reference), daje podatke za odpravljanje posameznih delnih postopkov ali rezultatov.

Za vse te aktivnosti so bile oblikovane štiri osrednje zbirke podatkov sistema SOCRATES, ki

adapted to various output protocols, end user's needs and target functions, adapted to specific procesess with specific documents;

— the implementation of the actual lists of controlled terms, professional classifications, lists of standard abbreviations (acronymes), etc. and to interpret the data which can be extended by the operator with proposals to adapt the answers to the specific conditions;

— the implementation of the SOCRATES consistence rules, which can also be extended in the specific implementation by observations of consistence by comparison of transparence of global answers (classification) and specific answers (controlled terms);

— the implementation of standard information products, which can be produced by a »push button« procedures, where the specific subprocesses are chained into »links«, which present an autonomous group of operations and can be a routine with a specific result, used as a component of the complex information product;

— the implementation of standard strategies, where the specific »links« are chained to an information product or combined into information product networks, adapted to specific problem oriented demands, solved as problem patterns;

— the implementation of information analysis methods and strategies to optimize the information networks and to get the expertize as an optimized product;

— automation of the expert work in procedures where no decision is needed;

— generation of data needed in other parts of the integrated system, other modules of the system, making the global system SOCRATES as an integrated information system.

The pragmatic and apobetic functional level are executed in this way. The apobetic level in this module becomes significant and deals with the other modules over the global system as a development, research and management tool.

The local functions of the information retrieval work station are managed in the background by the local control system, which controls the consumption of resources, controls the orders (information needs of the users), generates control data for the local and global system, offers data for the adaption of the information and document ordering system together with the whole data entry system, offers data for acceleration or system damping with regard to the end times and participants in the specific parts of the system (references), offers data for the restructuring of processes, etc.

Four central files of the system SOCRATES were created for all these activities, most of them not accessible to the end user, operating on the cellular computer system. These files make possible recapitulations, executing protocols both for

delujejo na celični ravni in večinoma niso dostopni končnim uporabnikom zunaj sistema ter omogočajo ponavljanje posameznih operacij ali izdelave posameznih delov protokolov ali celovitih protokolov, tako posameznim uporabnikom kakor tudi vodstvu informacijskega sistema. Te zbirke in pripadajoči informacijski procesi omogočajo polno povračljivost (nadzor) procesov, njihovo simuliranje ob spreminjanju vzrokov ali posledic, ob različnih okoliščinah itd.

2.3 Administrativni modul

Administrativni modul je sestavljen iz postopkov, ki so namenjeni dokončevanju izdelkov. npr.: namiznemu založništvu, grafični predstavitvi podatkov, predstavitvi v načinu »kar vidiš tudi dobiš«, preformatiranju podatkov itn. in je osredotočen predvsem na administrativni delovni postaji.

Administrativna delovna postaja je namenjena notranjim in zunanjim potrebam in zahtevam informacijske celice. Tukaj se informacije, ki niso del informacijskega sistema SOCRATES ali niso združljive s tem sistemom, preformatizirajo ali prepišejo ali celo popolnoma ročno predelajo v informacije, združljive s sistemom SOCRATES ali pa tudi nasprotno: predelajo se v informacije, združljive z drugimi zahtevami glede na zahteve nadrejenih struktur. Ta delovna postaja je vezana na celični računalniški sistem in deluje z enako programsko opremo kakor drugi moduli, vendar mora biti dopolnjena s programsko opremo za dodatne zahteve drugih, nezdružljivih sistemov. Ta modul (delovna postaja) je pomembna predvsem takrat, kadar so okolja delovanja informacijske celice nerazvita in je treba veliko dela prevajati na druge nezdružljive ravni.

2.4 Raziskovalna in razvojna delovna postaja

Ta delovna postaja je popolnoma opremljena z vsemi moduli, saj so bili vsi moduli razviti na njej. Na tej postaji pa vsi moduli niso polno usklajeni s preostalimi moduli, saj se ti dostikrat za specifične potrebe razvijajo avtonomno. Vendar so vse znane funkcije, ki so združljive s celičnim sistemom, sistemom SOCRATES in informacijskimi izdelki. Predvsem so na voljo verzije in variante, ki jih je mogoče uporabljati tudi za druge razvojne cilje ali stopnje razvoja. Omogočajo simuliranje posledic z različnimi cilji, strategijami, uporabljenimi metodami itn.

Ta delovna postaja lahko deluje tako kakor druge postaje iste generacije in lahko popolnoma zamenja druge delovne postaje v funkcioniranju in so namenjene za nadomestilo drugim sistemom v primeru njihovega izpada.

Za to delovno postajo sta uporabljena dva mikroračunalnika sistema ATARI s procesorjem MC 86 000 za razvoj do konca leta 1990 in mikroračunalniški sistem 386/33 po letu 1990. Oba sistema imata različno programsko opremo in različen razvojni status (generacijo razvoja).

the end user and for the management of the system. They make the system fully repeatable, and enable simulation of variations of the solutions under different conditions.

2.3. Administration module

This module consists of processes oriented to information product finishing, like: desk-top-publishing, data presentation in the WYSIWYG mode, etc. and is concentrated on the administrative work station.

This work station operates for the internal and external needs of the information cell as a service station, where information is provided, which is not a part of the unified information functions or are not compatible to the system, or comes in classic (paper) form into the cell, or the answers have to be given in such a form. On this module the information is transfered from the system demands on the user demands and contrarily. This work station is also bound to the cellular LAN system and so to the services of the cellular computer. This work station operates with the same software under identical conditions as other work stations, but has not a dominant significiance for the whole system, while only subordinated operations are executed.

2.4. Research and development work station

This station is fully supplied with all modules, because all of the mentioned modules were prepared at this station in the research and development phase. Specific modules are not updated to the actual state at this work station, but on the cellular computer system, where an actual module can be delivered to each of the work stations. It is specialized to research and development of the systems, and so it has a greater memory system than other work stations, more powerful software with all development steps and variants of the software, to make possible the simulation of the effects and consequences under different targets, strategies, used methods etc. At this work station, the operating software developed by the cooperants is tested, proposals for further development steps are prepared, development strategies are prepared, etc.

The work station can operate directly in place of the other stations of the same generation and can fully replace any other station in its functioning, and acts as a reserve if one of the other stations is out of operation.

Two microcomputer types are employed for this work station, each of them in another generation (ATARI MC65000 system for development till the end of 1990, and 386/33 system after that year), which have different software at a different development stage.

Ta delovna postaja lahko zamenja celični računalniški sistem v internem delovanju brez fizičnih posegov v sistem. S temi posegi v sistem lahko popolnoma zamenja celični računalniški sistem, samo velik del podatkov je treba naložiti v pomnilnike.

3. CELIČNI INFORMACIJSKI SISTEM

Celični informacijski sistem mora povezovati delovanje posameznih delovnih postaj in podpirati medsebojno delovanje teh postaj s komunikacijami, po drugi strani pa jim mora omogočati specializacijo za posamezna funkcionalna področja.

Celični informacijski sistem mora povezovati delovanje posameznih delovnih postaj in podpirati medsebojno delovanje v smeri naraščajoče specializacije za posamezna funkcionalna področja na eni strani, po drugi strani pa komunikacije med posameznimi delovnimi postajami, med njimi in celičnim računalniškim sistemom ter med tem in nadrejenimi sistemi.

Združitev avtonomnih delovnih postaj je razvita kot tridimenzionalni (prostorninski) integracijski model v odprtem sistemskem okolju ISO/OSI referenčnega modela.

Nadrejeni sistemi so uporabljeni kot vzporedno hierarhično urejeni sistemi, ki imajo enak razvrstitveni status in dajejo delovanju celičnega informacijskega sistema njegove omejitve, zakonitosti delovanja, robne pogoje itn.

Celični informacijski sistem podpira:
— notranje delovanje z lokalno mrežo za prenos podatkov (LAN);
— zunanje delovanje z mrežami za prenos podatkov (WAN):
  * JUPAK mrežo kot priključek na javna omrežja za prenos podatkov,
  * DECNET mrežo kot priključek na zasebne mreže za prenos podatkov,
  * mrežo za prenos podatkov na ravni podjetja, ki jo upravlja ustrezen mikroračunalniški sistem.

Funkcionalne povezave (informacijske zveze) za dejavnosti ponujanja in nabave informacij so izvedene na:
— ponudniški sistem knjižničnega informacijskega sistema COBISS povezuje sodelujoče družabnike z njihovim glavnim računalniškim sistemom, kjer se vnašajo identifikacijski podatki za vsako knjižnično enoto na računalnik;
— sistem IC-INFO deluje kot vrata v sistem COBISS, kjer so uporabnikom v računalniškem procesu na voljo podatkovne baze sistema SOCRATES in se razvijajo dejavnosti strokovnega informacijskega sistema;
— mednarodni sistem FIZ TECHNIK, Frankfurt/Main, Nemčija, kjer so na voljo tudi podatki o naših objavah, predvsem v podatkovni bazi DOMA (DOkumentation MAschinenbau).

This station can also replace the cellular computer system in internal operations without a physical intervention into the system. With a physical intervention, system can fully replace the cellular system in its functioning, but a large part of the memorized data has to be loaded.

3. THE INFORMATION CELL SYSTEM

This cellular information system has to chain individual work stations and aid the cooperation of these stations, and also enable specialization to individual function domains.

The information cell system has to integrate the operations of work stations and to aid the work stations in operation on the one hand and, on the other, this system has to aid communications between specific work stations, between the work stations and the cellular computer system, and between the cellular computer and superior systems.

The integration of autonomous work station systems is solved as a threedimensional (volume) integration model in the open system environment of the ISO/OSI reference model.

The superior systems are used as parallel hierarchically arranged systems, having the same hierarchical status, which gives the operations limits, execution laws, boundary conditions, etc.

The cellular system aids the following:
— the internal LAN system,
— the external WAN connection:
  * the JUPAC network as a connection to public networks,
  * the DECNET network as a connection to private networks,
  * the MAN connection to the superior computer of the institution, using an appropriate microcomputer system.

The functional connections (information links) for the information offer/demand services are realized on:
— the host of the Library Information System (COBISS), which connects the cooperating members with its mainframe computer, where the identification data on all library units are entered in a specific online process and offered to other members;
— the host system of a private unit, operating under gateway conditions with the COBISS host system, where the public accessible databases of the SOCRATES system are offered to the end users under online information retrieval conditions, and where branch information system facilities are developed;
— the international host system of FIZ TECHNIK, Frankfurt/Main, Germany; where our data are also delivered and be integrated into the database DOMA (DOcumentation MAchinenbau).

Na ravni informacijske celice niso neposredno dostopne vse ciljne funkcije, nadzorne funkcije in funkcije prilagajanja, ki so razpoložljive na ravni posameznih delovnih postaj, so pa dostopne nekatere funkcije, ki jih na delovnih postajah ni mogoče ustvariti:

— funkcije ekspertne in razvojne delovne postaje so omejene na funkcije, ki ne zahtevajo postopkov umetne inteligence;

— večje so možnosti, ki jih ponuja zmogljiv večuporabniški, večoperacijski sistem, kjer je poraba časa za določene operacije veliko manjša (do 100-krat);

— sistem informacijske celice ustvarja pripomočke za delovanje postaj;

— osrednje zbirke sistema SOCRATES:
  • zbirka MEUP s podatki o uporabnikih;
  • zbirka MENA s podatki o naročilih in njihovi uresničitvi, kjer so shranjeni vsi podatki za polno ponovljivost naročil;
  • zbirka MERA, kjer se hranijo podatki o poslovni ravni (strukturirani podatki o stroških in cenah, časih izvedb itn.);
  • zbirka MECO, kjer so shranjeni podatki o sistemskih ciljih in doseganju teh ciljev s storitvami in izdelki: kateri vnosi so bili opravljeni, kdo je te vnose oblikoval itn.;

— vse zbirke podatkov sistema SOCRATES, ki se uporabljajo na tej ravni, so nadzorovane na doslednost, strukturirane in dostopne uporabnikom v računalniškem procesu samo pod določenimi pogoji in omejitvami kot družabnikom sistema SOCRATES.

4. VIŠJE INTEGRACIJE IN STOPNJE SAMOSTOJNOSTI

Informacijska celica je lahko povezana z različnimi okolji kot funkcijsko zaokrožena organizacijska enota:

— v okolje knjižnic kot izvedeniška skupina za stike z javnostjo;

— v okolje raziskovalnih in razvojnih zavodov kot specialist za posamezne funkcije dajanja in pridobivanja informacij, vrednotenje informacij itn.;

— v okolje podjetij z različnimi aktivnostmi za reševanje problemov vodenja razvoja itn. ali pa lahko delujejo kot samostojne svetovalne ustanove, ki ponujajo svoje storitve in izdelke na odprti trg.

Zaradi velike samostojnosti in polne modulne strukture in procesov delovnih postaj se lahko delovne postaje same pojavijo kot samostojne informacijske celice, kot specializirane enote za reševanje specifičnih problemov ali specifične storitve. Potrebne so samo manjše prilagoditve sistemov, tako pri strojni, kakor tudi programski opremi (treba je priključiti modem neposredno na mikroračunalnik in naložiti ustrezno komunikacijsko programsko opremo). Za posebno uspešne so se izkazale take informacijske celice (delovne postaje) pri uporabi na področju poslov.

On the information cell level, all target functions, control and adaption functions which are executed on the work station level are not accesible, but it has functions, which cannot be accessed on the work station level:

— the functions of the expert and development workstations are limited on lower levels, which do not demand artificial intelligence procedures;

— the greater possibilities of a multiuser, multitask system are very powerful, the time consumption is much lower than at the work stations (up to 100—times);

— the information cell system generates the tools for the work stations;

— the central files of system SOCRATES:
  • the file MEUP, with the base data about users;
  • the file MENA, which defines the data about orders and their online executions, where all data for the full repeatability of the orders are stored;
  • the file MERA, where the economic level data (structured costs and expenses, execution times, etc.) are stored;
  • the file MECO, where the control data of the system targets achievement are stored: which items in the specific database have been touched, who has created these items, etc.

— all local SOCRATES databases which are updated on this level, are controlled on consistency and are structured and accessible to users only under special conditions.

4. HIGHER INTEGRATION AND AUTONOMY LEVELS

The information cells can be integrated in various environments as funcionally rounded off organization units:

— into libraries as expert groups with public relation facilities,

— into research and development institutions as information specialists for information purchase and delivery extended to information evaluation,

— into enterprises with multifunctional activities for solving management problems or they can operate as autonomous consulting institutions, offering these products and services on the open market.

Because of the high autonom and full modular structure and process operation of the work stations, the work stations themselves can appear as autonomous information cells on this level, as specialized units for solving specific problems or services. Only small adaptions of the systems, both to the hardware (modems only have to be directly coupled on the PC systems) and to the software (only communication software has to be placed on the PC) are needed to adapt the work station as a fully autonomous unit. These types of cells have been especially successfully implemented in the business applications.

5. POGOJI ZA UPORABO

Velika samostojnost in polna modulacija imata pozitivne in negativne posledice, ki se pojavijo zelo hitro in imajo velik posredni učinek na sistem sam in neposredni prek sistemske zaščitne ovojnice na svoje okolje zaradi zelo kratkih informacijskih pretočnih časov. Specializacija teh sistemov je posebno občutljiva za naslednje dejavnike:

— motivacijo osebja, ki se ukvarja s temi sistemi;

— znanje in izkušnje analitičnega načina mišljenja;

— komunikacijske zmožnosti udeležencev teh procesov za skupinsko delo.

Glede na te pogoje je delovanje teh sistemov posebno občutljivo na človeške dejavnike, ki vplivajo na rast teh sistemov in na rast odvisnih procesov.

Zunanje okoliščine vplivajo na rast s podobnimi procesi; in če so notranji in zunanji procesi v sinergetični razvojni fazi, lahko ti sistemi eksplodirajo.

Vendar so procesi razviti tako, da se s svojimi lastnostmi prilagajajo svojemu okolju z lastnimi samonadzornimi in prilagodnimi mehanizmi na tak način, da lahko ta sinergetični učinek dušijo s premikom lastne faze kot regulacijskim dejavnikom. Tako je prilagajanje glavna lastnost teh sistemov v celoviti sistemski zgradbi. Procesi so torej razviti kot homotipi.

Tako mora biti osebje, ki dela s takimi sistemi, zelo skrbno izbrano, da take funkcije opravlja zanesljivo in uspešno.

6. SMERI RAZVOJA

Na splošno so bile ugotovljene naslednje usmeritve:

— Organizacija v obliki informacijskih celic vodi zelo hitro v specializacijo posameznih sistemov, zaradi česar se tudi nadsistemi nagibajo k diferenciaciji. Tako nagibajo knjižnični informacijski sistemi k neodvisni navpični integraciji in k izločanju intelektualno bolj zahtevnih ekspertnih procesov v svoje okolje, kjer potem ti procesi rastejo v neodvisne enote in se izločajo iz knjižničnih sistemov.

— Zaradi velike prilagodljivosti izvedenskih skupin se nagibajo k povezovanju s svojim naravnim okoljem (raziskovalne in razvojne aktivnosti) ter povezovanju storitev in ponudbe izdelkov.

— Zaradi tega se pojavita dve panogi, ki delujeta na istem področju, toda z različnimi funkcijami; prva, ki uporablja informacijske procese predvsem za delovanje s primarnimi dokumenti in druga, ki jih uporablja predvsem za sekundarne dokumente in izvedenske aktivnosti.

5. IMPLEMENTATION CONDITIONS

High autonomy and full modularity have positive and negative consequences, which appear very fast and have mayor direct influences on the systems themselves and indirectly over the system environmental fields due to the low information flow times. The specialization of these systems is especially sensitive to the following factors:

— the motivation of the people engaged on these systems;

— knowledge and experience in the analytical way of thinking;

— the human communication nature of the system members in the team-work conditions.

Due to such conditions, the operation demands are especially sensitive to human factors, which affect the growth of such systems and the growth consequence processes.

External conditions influence this growth with similar growth processes and if the internal and external processes are in a synergetic development phase, the systems can explode.

They are designed to be adaptive to such conditions, including the self—control processes to damp these synergetic effects, implementing the controlled phase shipment as a control regulation factor. So flexible adaptation to the environment, is the main quality of these systems in the whole system architecture. The processes are thus developed as homeotypes.

The staff handling these systems have to be carefully selected to deal with target functions reliably and successfully.

6. DEVELOPMENT TRENDS

The following development trends in general are identified:

— Organisation of the processes in information cell forms tends very quickly to specialization of systems, with the result that the superior systems tend to differentiation. So library systems have a tendency to integrate into autonomous vertical units and to separate the more intellectually intensive expert processes and to push them in their environment, whereby these processes grow to autonomous units and separate from the library systems.

— Due to the high adaption ability of the expert teams they tend to integration into their natural environment (research and development activities) and integration into product and service offerens.

— As consequence of this processes two branches acting in the same field exist, but with different goal functions; one implementing the information processes mainly for handling primary documents, and the second, handling above all secondary documents and expert activities.

Specifične razvojne usmeritve:

— poenostavitev vseh sistemov in usposabljanje za samozaščitno delovanje z uporabo preproste tehnike krmiljenja predvsem za reševanje nezahtevnih problemov in v okoljih, ki terjajo zanesljivo delovanje;

— razviti 6. in 7. raven referenčnega modela ISO/OSI (predstavitve in različne neposredne uporabe);

— povezati sistem SOCRATES v okolje EDIFACT (Electronic Data Interexchange For Administration, Commerce and Transport).

7. SKLEP

Opisani sistem SOCRATES sloni na že delujočih sistemih, ki so bili razviti z lastnim raziskovalnim in razvojnim delom. Smeri razvoja so bile ugotovljene med uvajanjem sistema in na ekspertnem delu v kooperativnih skupinah za reševanje dejanskih problemov.

8. LITERATURA

Za izdelavo tega dela je bilo uporabljenih več ko 300 virov. Računalniški izpis je dostopen v uredništvu.

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Specific development trends:

— to simplify and to make these systems into self—protective systems, using simple techniques, for unpretentious problem solving applications, and to make them reliable;

— to develop possible aplications of the sixth and the seventh level of the ISO/OSI reference model environments;

— to integrate the SOCRATES system in the EDIFACT environments (Electronic Data Interexchange For Administration, Commerce and Transport).

7. CONCLUSION

The paper presents a description of already realized systems which were developed on the basis of research work by the author. Development trends were observed during the implementation of the systems and in personal expert work in the cooperation of the teams in real problem solving.

8. REFERENCES

More than 300 references were used for the above research work, the list of which is available at the editorial office.

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Pripis urednika:

... na. poglej. iz črk zmeraj nastajajo besede.
kaj pa nekatere izmed njih pomenijo. vedi vrag.
Nikolaj Gogolj. Mrtve duše

Editors Note:

... look, letters always yield words, but what some
of them mean only the devil might know.
Nicolai Gogol'. Dead Souls