

The Changing HRMS Landscape

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There are some major changes taking place in the human resource management systems (HRMS) landscape. Web services, service-oriented architecture (SOA), component development, and new software delivery methods are all contributing to substantial change. On-demand HRMS business solutions are gaining popularity every month. Present indications are the uptake will continue to increase during 2007 and by 2010 the option will become mainstream. On-demand is not just a new technology stack; it is a whole new business platform and will throw down a challenge to the conventional on-premise model that has dominated for so long. The players are still the same but the playing field has been moved to a new level. The acceptance of the new platform will cause some dramatic changes to HRMS and the way software needs are specified, products are built, components are sold and solutions assembled and deployed. Although the rules may have changed, the issues – such as integration – are still the same, irrespective of the platform.

ON-DEMAND IS THE LOGICAL EVOLUTION OF COMPUTING MODELS

Just about everyone today relies on their Web browser as a means of communication, accessing information, and doing business without caring what is happening in the background. Very little software we use actually resides on our company infrastructure, and most modern HR systems are accessed via a browser irrespective of the back-end architecture. However, it is the maturing of the back-end architecture that has enabled the on-demand concept to flourish and it is important to understand how the computing model evolved in order to differentiate it from outsourcing, bureau services and previous application service provider (ASP) models.

EVOLUTIONARY PHASES

The HRMS model consists of three major components: The database, the user interface (or presentation), and the application code. It is the location of these components within the computing network that has contributed to the growth of efficiency and lowering of costs over the last four decades. In the early days of business systems, the mainframe was the only choice for industrial strength computing and all three components resided on that one computer. Interaction with the computer was restricted to information

technology (IT) personnel; input and output was controlled by highly specialised staff, and the user contact was via transcripts for data entry or written requests for reports. There was no network to allow access outside of the closely guarded computer rooms.

After the introduction of mini computers and desktop personal computers in the 1990s, client/server technology and distributed networked computing emerged. The three major components were then positioned around the network according to customer preference to optimise computing access and processing. Terms such as thin client and fat client emerged according to where application and database servers were positioned in a company's local area or wide area network.

Then came the Internet: Dependence upon a robust internally managed network was lifted. The need to have the database, application and user interface residing on a server within the company's premises was no longer necessary. The most popular form of access to HRMS transactions was the Web browser. It was no longer important to the end user where the actual HRMS resided.

APPLICATION EXPECTATIONS

As technology matured, the business computing need shifted. The Internet made business real-time and global and the expectation for business applications changed. The expectation became fast, flexible and agile systems that could respond to change in days, not years. The on-demand business application deployment cycle reduced the implementation timeframe to days and weeks, so the needs analysis, requirements specification methodology and selection process now needs to be similarly compressed. The expectation is for an environment where it is possible to identify individual software components to support the HR best practice model, and then go shopping online for the right mix of HRMS components: having selected the right mix from the right vendors at the right price, install, implement and start using the software in days, instead of years. The technical expectation for HR business applications is component assembly.

THE PROBLEM ON-DEMAND SOLUTIONS SOLVE

The capability of on-demand software providers to deliver a more seamlessly integrated solution in a short timeframe and using a community of software developers

has highlighted some of the competitive flaws and problems associated with the on-premise solution.

Costly integration

No single system meets all the HR technology support needs of an organization. Many older generation HRMS have a monolithic structure and it is difficult to modify or add on components. If a company is locked into one vendor's product, they are probably locked into their "best HR practice" process design. If they want to change their product or enhance its functionality, they must pay extra. The only alternative is to buy products from other HRMS vendors as standalone solutions. To purchase multiple solutions from different vendors usually means:

- Duplicated data maintenance effort,
- Costly and complex data exchange programs between applications, and
- Expensive integration.

Inflexible design

The current inability of technology to cope with change is due to the inflexible way in which systems have been packaged and sold over the last 30 years. As database technology evolved from flat files, to hierarchical structure, to relational tables and programming evolved from COBOL, to structured, to object-oriented, HRMS systems built for one era were not rebuilt for successive eras. Most were patched up to survive and carried much of the baggage forward into the next generation. It is now time to take a fresh approach and rebuild systems from the ground up and preferably to a common HRMS component model.

Lack of standardization

There are about 2,000 prominent HRMS products sold around the world today and the solution to most HR business processes cannot be found in one single product. For most organizations the total solution resides in a combination of products, yet almost all of them have been designed and built in isolation of each other. They have different database structures and will not integrate with each other. The bottom line is inefficiency, poor data integrity and unnecessarily high costs. There has been no attempt at a common business design standard, yet almost all use the same basic data elements. It is hard to believe that there can be 2,000 different ways to describe a person's name, address, job, etc. The common usage need exists, but the HRMS industry problem is that no one wants to incur the cost of rebuilding their system to conform to an industry standard.

Slow to implement

It was once believed that business applications, including HRMS, had to be specified and built based on a unique set of business requirements (everyone's needs were different). Therefore, their delivery was expected to span a couple of years or more. Large monolithic systems were often built in-house by internal IT resources. Then came packaged HRMS solutions, built to a generic business model, recog-

nizing common business needs. Implementation speed has improved, but unless an organisation has already moved to an on-demand solution, the current process is still far too slow.

TECHNOLOGY PLATFORMS

There are four popular technology platforms that allow interoperability to choose between. They are CORBA (from OMG), EJB (from Sun Microsystems), COM (from Microsoft) and Web services and SOA.

For on-demand HRMS applications, Web services and SOA has emerged as the most popular platform due to its integration capabilities and published specifications. Development tools, such as Apex used by Salesforce.com, the leading on-demand CRM company, allow communities of developers to build products for the Web services platform. Some on-demand companies will still use their existing products to provide an on-demand service. Others will build a new product. The differentiator from a provider perspective will be the ability to handle multiple clients at the most competitive price. The multi-tenant-designed software using the latest development tools will be the only sustainable solution. Those suppliers using the old outsourcing operational method, with dedicated servers and client-separated applications will find it difficult to compete with the single instance operation of the multi-tenant operators on a pricing basis.

The real break-through application technology that enables flexible and integrated systems is component-based technology. It provides the ability to plug in services and components to assemble systems from pre-built objects and re-usable code. To explain the difference between services and components, the document, *Services and Components Based Architectures: A Strategic Guide for Implementing Distributed and Reusable Components and Services in the Federal Government*, makes the following distinction.

"Software components are units of software that provide business or technical functionality. These units are independently deployable; that is, they are self-contained and can be deployed virtually anywhere on the network. Business components execute business logic, enforce business rules and manage corporate data. Technical components provide the platform or infrastructure capabilities that the business components rely on, such as messaging, error handling, security, etc."

"Services represent a broader concept than components. They are the activities executed in response to a request (or an event) in order to deliver some result. Both concepts employ the notion of an interface that defines the set of activities (or services) offered. However, whereas all components offer functionality as services, not all services are implemented as components."

The development of business applications using services and components has been likened to building structures with LEGO blocks. LEGO blocks are numerous, have a similar purpose, are used to assemble structures from models, they come in many different colours and sizes, they

are interoperable, reusable, unbreakable and composite in nature (you need many of them to make something – one block on its own is not much good). In order to successfully join the LEGO blocks together, there needs to be a way of knowing what blocks are available, how they fit together and how to locate them when needed.

INFRASTRUCTURE COMPLEXITY AVOIDANCE

One of the attractive features offered by on-demand solutions is the avoidance of infrastructure complexity and volatility. Until the new middleware platform stabilises and becomes more predictable and guarantees continuity of products and standards, there is a strong case to pass the problem to someone else to manage. The complexity relates to Web services, SOA, the associated technical specifications and component discovery techniques.

Web services and SOA

Web services and SOA is favoured by on-demand software providers and IT units because it not only solves a middleware communication problem but it also supports business process management, which is an integral part of most modern HRMS applications. When assembling a workflow, SOA enables the decomposition of a current business application into reusable “services” and then arranges the components into an orchestrated flexible business process flow using a Web services Business Process Execution Language (WS BPEL) tool.

Although SOA became synonymous with Web services, it is not exclusive to Web services and offers quite different things. Service-oriented architecture is not a product; it is an architectural model for components. It models the relationship between different functional units or “services.” It gives structure and provides interface and contract details to a collection of Web services. Service-oriented architecture goes beyond providing a structure for Web services and middleware: SOA can be a solution for Electronic Data Interchange (EDI), Enterprise Application Integration (EAI) and Business Process Management (BPM). It is sometimes referred to as Process Oriented Architecture (POA) because it combines a series of “services” into a structured workflow sequence with the use of specifications and standards.

Web services alone will not deliver benefits unless governed by services-oriented architecture. The “services” need a structural framework in which to operate. The SOA infrastructure illustrated in the following diagram contains all of the items (shown within the box) that enable component/web service application assembly.

At the heart of the SOA infrastructure is the Enterprise Service Bus that enables communication between all of the Web services and components. But, for components and services discovery purposes the critical items in the infrastructure are the Repository, the Business Rules Engine and the Registry. That is where metadata is stored containing the Web services and component descriptions and interface details. The business reference model framework provides a logical structure for storage and discovery. The IDE is the

mechanism for compiling the working parts that go to make up the final business application.

Current monolithic legacy systems (shown outside the box) may be reverse engineered to identify the Web services and components to be stored and registered and made available for application development. Component software developers can build new components for the application and external component registries can list available components for system integrators to purchase and use.

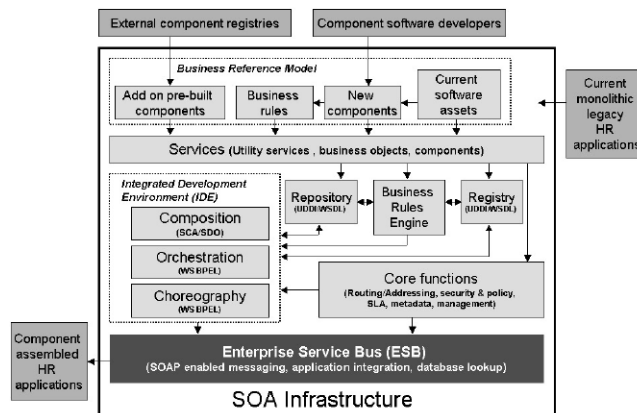


Figure 1. SOA Infrastructure.

Technical Specifications

The current trend is for products to incorporate their own proprietary toolset to build objects based on built-in modelling tools. Usually, they follow the Object Management Group’s (OMG) Model-Driven Architecture (MDA) and apply Use Case or State diagrams based on the Unified Modelling Language (UML) to describe objects and model relationships. The end-result is that they each create a model of the business on which to build and deploy their solution. As the business changes, the model identifies which components or objects need to change. The problem is they have created their own HRMS universe and each developer is re-inventing the wheel.

The main players creating middleware standards are OMG for modelling, HR-XML group for data interchange using Extensible Markup Language (XML) in the HR domain and Organization for the Advancement of Structured Information Standards (OASIS) for Web services and SOA. Most software vendors have built their SOA products compliant with specifications developed and published by the OASIS group or the World Wide Web Consortium (W3C). The two most prominent specifications are Universal Description, Discovery Integration (UDDI) and Web Service Description Language. Service-oriented architecture services are described according to the specifications to facilitate the semantic discovery of components and services.

The diagram illustrates the role of each specification in a process to define and locate Web services for use. The specifications are based on XML and the communication between all of the components is enabled by the Simple Object Access Protocol (SOAP).

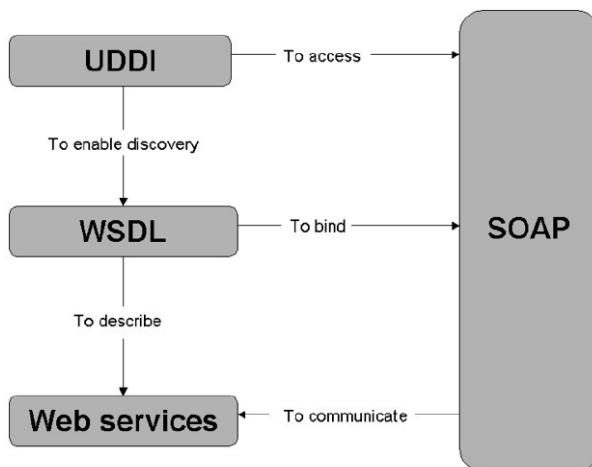


Figure 2. Specification Relationships.

COMPONENT DISCOVERY METHODS

Irrespective of whether the platform is on-demand or on-premise, the method for discovering the right component is critical: It must be fast, efficient, and provide sufficient detail to ensure the component has the right behaviour, attributes and identifies the necessary dependencies. At present, the component software market relies on three techniques to locate the right set of components. They are the Semantic Web, Reference Models and Commercial Component Registries (CCR).

The CCR technique is the most suitable for on-demand because it is able to provide a catalogue of components for the client to select from.

Semantic Web

The Semantic Web is based on syntax, vocabulary, grammar, taxonomy, and ontology concepts to describe services. The search process objective is to match vocabulary (key words) and semantic descriptions. Specifications such as UDDI and WSDL, developed by the OASIS Group, support the search process by articulating a way of describing components.

Reference Model

The most prominent user of the reference model approach to component and service discovery is the U.S. Federal Government. The reference model method is used to promote the reuse of code and information sharing across federal government "via the standard description and discovery of common data and the promotion of uniform data management." The reference model concept is sponsored by the Office of Management and Budget (OMB) and the federal Chief Information Officer (CIO) and is based on the Federal Enterprise Architecture (FEA).

Commercial Component Registries

There is a far more robust and simple-to-use method for SOA component and service discovery that is business "user friendly." It is the CCR approach that catalogues products based on a working HR system model. The CCR talks the

business jargon and provides an HR system market structure that the business community can relate to.

Unlike semantic technology, little or no investment has been directed at CCRs. It is an emerging option driven by organizations representing the business and not by IT. Design of the registry requires a very detailed knowledge of the business subject and requires standards supported by the business community. It must be based on an agreed business model and contain data definitions, component class descriptions and business rules.

The CCR approach is sure to be successful because applications built for the HRM domain are ideal modular solutions for SOA development and CCR listing and discovery. The Human Resource Component Software Application Standard (HR-CSAS) represents the right business model on which to base the Web services market. From an HR perspective, users need to find the "LEGO" blocks they need in a format that is familiar to them. They don't need an abstract model or a semantic description that needs to be decoded before they are sure they have the right "LEGO" block, and then find out later they needed three other blocks in order to clip that block into place. The semantic description alone does not provide the full story and having found the supplier of a semantically matched component does not ensure quality, credibility and reliability. The component attributes, behaviours, and dependencies need to be known along with the description. There needs to be a supplier registration process administered by a CCR to ensure market confidence.

Finding the right component for assembly must be repeatable and the object must have the equivalent of a catalogue reference number. Human Resources needs a business model that will form a hierarchical structure, based on HR business process, that can be used to drill down to the level needed to match requirements. The definition of the service (object) and description of the business rule can be viewed to determine whether the business rules aligns to the company's Enterprise Agreement or Industrial Award.

THE NATURE OF CHANGE

In order to adopt on-demand business solutions and for the concept of software assembly using services and components to move forward, many areas of the business need to change.

The main areas that will experience change are:

Process Thought Leaders

Process thought leaders will devise new and innovative ways to manage people. Human resources programs will be designed, based on thought leaders' concepts and supported by technology. Thought leaders will work with component software developers to translate their thoughts into data types and information reports, to give managers the technology tools to manage the new process better. For example, subject areas will include:

- New benefits and compensation initiatives to attract and retain staff,
- New recruiting techniques,

- New online learning programs,
- New talent management initiatives, and
- New ways of appraising staff performance and developing skills and competencies.

The time frame from innovation to implementation will be dramatically reduced because thought leaders will work directly with software developers.

Educators

New courses will emerge to teach technical staff how to build component infrastructure environments, including object programming techniques based on component assembly of products. The middleware protocols and networking considerations associated with component deployment will become the focus of education programs. Universities and tertiary institutions will take up the challenge and respond to the education needs that will emerge with the new generation of component-based software applications.

Component Products

Component products will become the most attractive HRMS option. As larger software companies are merged and acquired, the smaller software companies will struggle for market share and eventually disappear. The large companies will create third-party communities to build add-on solutions to their HRMS products. Over time, the communities will merge into one open standard community, driven by market pressure. Boutique component products will emerge as a cost-effective and functionally rich alternative. Interchangeable component products will become the first choice for HRMS purchasers. Systems will be assembled from component products.

Workflow

Web services and SOA enables better workflow applications that are flexible and expandable. Workflow steps can be orchestrated or choreographed by users and services can be called up as part of the workflow process. Services can be an integral part of the application or can be third-party products.

Business Standards

There are middleware and distributed computing communication protocol standards needed for the interoperability of HR systems components, but they do not address business application design. The interoperability standards published by numerous standard bodies today stop at the middleware layer and vendors still provide a proprietary solution beyond that point to the vertical HR business domain.

The way of the future is having a common business model to define structure for HRMS component design and HRMS component markets. The market for HR component applications will drive the need for an industry standard and the business community will develop and maintain it. The

commercial opportunities will drive the acceptance of standards rather than top-down imposition of a standard by a standards-setting body.

The commercial success of SOA is dependent upon acceptance by the business community. From a human resource application perspective, there needs to be a common business model to guide application developers and the software market. The solution for a business model is the HR-CSAS, which covers both the business and technical infrastructure (see Figure 3) and has been developed by the HR community. The HR-CSAS forms the structure for component registries that are the "LEGO" blocks storage facility. "LEGO" blocks are catalogued so they can be found quickly and assembled into the HR application, and if a different colour "block" is needed later, it can be swapped using the same catalogue reference number.

The HR-CSAS hierarchical structure, based on the HR business function, is used to give a logical structure to the internal repositories and registries and external component registries.

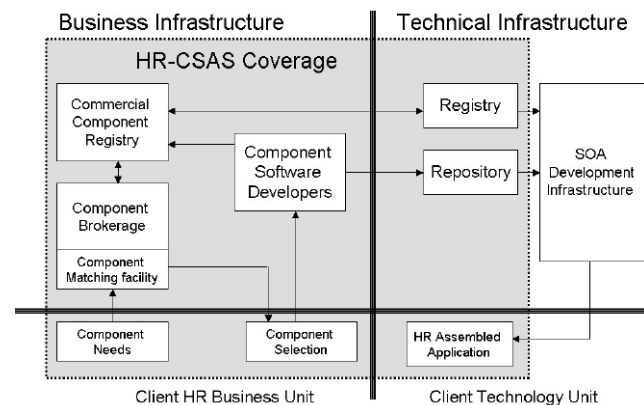


Figure 3. The scope of HR CSAS usage and coverage.

The HR-CSAS document contains a definition of component classes and subclasses to catalogue HR services, a naming system for services (components and objects), and a database structure for data stores to enable the re-use of information reports.

Developers

Developers will emerge at all levels of the supply chain, from the specific object programmer to the larger component assembler. Objects will become the building blocks for developers and will be sourced as reusable code in different formats. Pre-tested objects will be assembled by programmers into working component products, designed according to client specifications.

Most large on-demand software providers will form communities for component application developers. They will provide the tools and application programming interface (API) details to enable the construction and integration of supplementary products.

Buyers

Buyers will no longer be HRMS project teams or CIOs. Buyers will be the business practitioners. The technology most suitable to support HR processes will be well known to the buyers. Purchase and implementation will be an ongoing process. Buyers will have a much better knowledge of the market.

System Implementers

The function of assembling an HRMS from multiple components will be the main focus of HRMS implementation. It will become a specialist role. The implementation will no longer be a technical function involving system configuration, data conversion, training program design and product roll-out by project team members. The system implementers will come from the business and be the owners of the process that the new component addresses. Knowledge of the component software capability, and the HR function that it supports, is a big advantage and the best person to take charge of the implementation will be the person who was responsible for choosing the component in the first place.

Consultants

Traditional consulting practices will not have a place in the new component software era. Implementation assistance may still exist, but the role they play in needs analysis and product selection will change. The new service will be Internet-based and selection of products will be mainly online through software brokerages. No doubt most large consultant organizations and many vendors will set up their own HR component brokerages, or component shopping malls, as the component-based software market evolves. Thousands of objects will become available on the market.

HRMS Marketplace

The on-demand software marketplace will be totally different to the traditional on-premise and enterprise resource planning (ERP) marketplace. The business process owner will most likely be the person who makes the purchase decision. The focus will be on business process, rather than technical platform and infrastructure compatibility. Process description and classification will determine the structure of the Commercial Component Registries, Component-Off-The-Shelf (COTS) marketplace and software design standards. A component-based integration standard will be a guide for software vendors. Development of the standard will be based on detailed analysis of business processes and the decomposition of a traditional HRIS into the micro components to identify the very basic building blocks.

The HR business practitioner group needs to know where to find the product that supports their HR process or business function. Without a component class structure designed along HR business function lines, finding the right object (to plug into the framework) would be like looking for a needle in a haystack. To facilitate the location and selection of components and objects, there needs to be a simple interface for the buyer and seller. Without the simple inter-

face, buyers would have to sift through thousands of product brochures to locate the right group of objects, and sellers with smaller specialty components would have to spend a fortune to get their product to market.

The HR component vendors and object developer groups need to understand the business requirement, know the specifications, and know how to build the right group of objects that will have a market demand. Central to all development is a core standard for naming, defining data and grouping objects into component classes.

From a market perspective, the process is the start point. The market deals in component classes and object types. There is a need to translate the process requirement into functional fit categories so that they can be analyzed for technical compatibility and integration suitability. Any business-related COTS market must provide a graphical link (diagrams) between process, component and object. Buyers must recognize the process they want to implement and understand the role objects play in the broader HR business practice context.

One obvious problem that will arise as component development becomes more popular is the extent of the choices and the selection process. Component markets are only a series of objects grouped according to class and the combination of objects will number into the thousands. To suggest that a total solution would involve purchasing objects from thousands of vendors is totally absurd. The businessperson requires a simplified way of locating the right set of components and buying as many as possible from the one vendor (the principal supplier), including the component framework. The functional gap between requirements and the principal supplier's product capability is addressed by purchasing components from other vendors.

THE HUMAN FACTOR

Before organisations can achieve benefits from the on-demand model, there needs to be a mindset change from the traditional way HR software needs have been specified and products purchased. That is the biggest barrier of all, and whilst commercial and technical barriers are mostly resolved, the change associated with the human factor will take a little longer.

John Macy is the founder of Competitive Edge Technology, a consulting company formed in 1994 specializing in human capital management software. He has more than 35 years experience as a senior HR manager with an international airline, and as a consultant in HR technology usage. He is an advocate of service-oriented architecture, Web services, component-based applications and business driven standards to achieve greater flexibility and integration. In 2002, he published the HR Component Software Application Standard and set up the first component software brokerage. In 2006, he introduced the first commercial component registry for HR products. He has written several books and published many articles on HR technology. He has worked throughout Asia, the U.S. and Australia on consulting assignments and is a senior global advisor for Jeitosa Group International. He can be reached at john.macy@cet-hr.com.