STRATEGIES ON SOFTWARE INTEGRATION

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ABSTRACT
The strategy represents in a general way "a well-defined and structured set of fundamental long-term objectives, together with allocated resources and the ways these can be used effectively in accordance with established goals, in order to obtain better competitive results." Software integration is not a new concept as it has been addressed from the moment the companies had no more than two systems and a network connection. The problem of integrating applications at company level has become very important, with direct effects on the work of any economic society. As such, the specialists in the field developed true strategies for addressing and solving the integration of information systems.

Keywords: Integration software, Vertical integration, Horizontal integration, Integration mixed, Business Process Oriented.

1. APPLICATIONS INTEGRATION. GENERAL FEATURES.

Applications integration is a strategic approach to unify multiple systems, both at the level of services and level of data. It offers the opportunity to set up data exchange between systems and reuse business processes in real time. Although it seems to be a purely technological issue, resulting stream of data and processes provide businesses a strategic advantage: the ability to run businesses in real time, in an environment based on events, with low latency, reusing their IT resources in optimal conditions.

Integration of existing applications for different departments or companies can take 3 paths:

a). Vertical integration, including the achievement of adaptative services to connect existing applications and data with other new applications, platforms and services such as Web services.

b). Horizontal integration, which involves the construction of adaptative services to connect together existing applications and data.

c). Mixed integration, involving both the integration of existing applications, as well as some other new applications.

All these techniques need to respond to requests related to the preservation of consistent data, the data visibility and the need to ensure their security.

Among the existing types of applications integration we can find:
• Data integration technologies
• Application integration technologies at organizational level of domestic nature (Enterprise Application Integration)
• Integrated software packages (Enterprise Resource Planning - ERP)
• Business process integration technology of external nature (Business to Business Application Integration).

Although any form of integration uses relatively different technologies, both the integration of intra and inter - companies contain a set of common models.

Today, software integration is a real necessity in order to make possible the data and services integration that are included in the internal systems of companies.

Techniques used in order to integrate applications have evolved from technology-oriented exchange of data, the technology-based services.

Integration-oriented exchange of data (information oriented) provides a simple mechanism for the integration of applications, avoiding the modification of the latter. Service-oriented integration (service based application integration) approach is not a new way: tools for creating the link between application-level services have been designed and are used for a good period of time (frames, transactions and distributed objects)

The new concept based on web services introduced by Microsoft .NET strategy and supported on J2EE by IBM in the beginning and then by all the significant names of IT industry, means nothing else than defining a system that allows the use of the Internet to provide remote access to the application services through well designed interfaces and an index of available services.

There are many ways to use of this type of integration, because it offers the possibility to create new applications that contain processes and data from several applications. Service level integration offers long-term strategic advantages, but also presents some disadvantages. One of the disadvantages lies in the need to modify both the applications that must provide services and applications that will use these services.

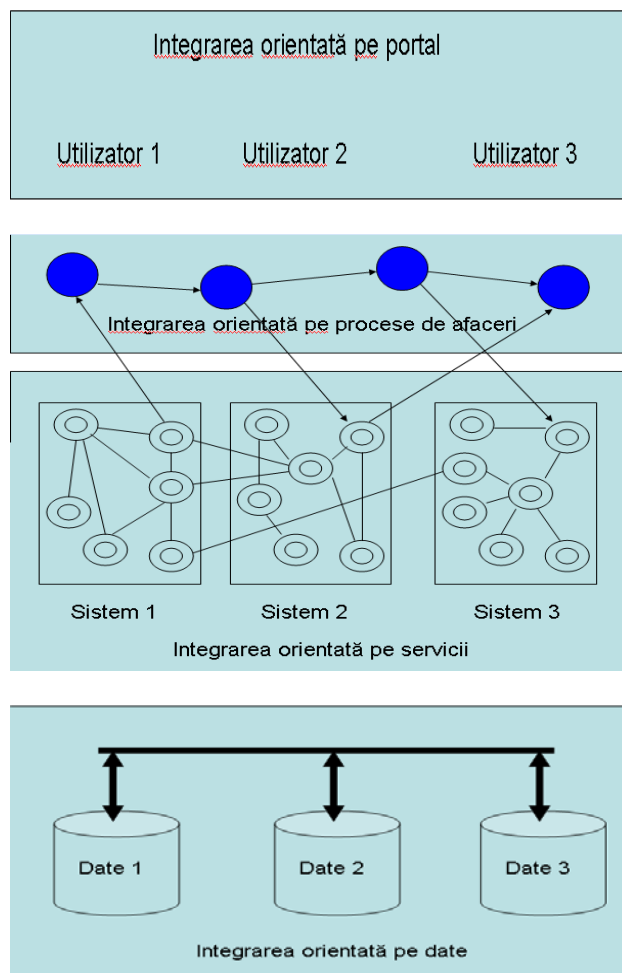The following presents the main types of integration

Fig 1 Strategies for integrating applications

Consequently, the data level integration is less costly because it has a reduced impact on applications, but it is also less powerful in terms of reusing the business logic of the company. For the adoption of services oriented integration one can choose " small steps policy", with reduced risks, through publication and use of a growing number of services, thereby enhancing in time a true "service court" of the company.

2. DATA ORIENTED INTEGRATION

Systems integration involves data processing, a process that is based on procedures such as:
- Change in data format
- Rules for replacing the missing values
- Rules to ensure consistent data
- Rules to ensure data integrity
- Methods of filtering and combining data
- Data history
- Algorithms for data aggregation or disaggregation
- Algorithms for getting derived data, etc.

Integration at data level consists of integration at database level, either through data migration from one system to another, either through the creation of common data warehouses to be operated by more systems. Solutions based on data integration can be classified into three categories: data replication, the federalization of data and interface processing.

a). Data replication - consists in duplication of data from two or more databases. Replication is used in the case of spatial distributed enterprises. Data from the central database needed for a specific service are locally replicated and then the local upgrades are transmitted to the central node. The source and destination database may belong to the same or more producers and can have homogeneous or heterogeneous database management systems with different data models. For data integration were developed middleware solutions that provide replication by installing a software level between two or more databases. The data is extracted from sources and it is entered in the destination database.

Frequent updates of data require a replication server. It may be of different types: many to many, 1 to many, many to 1 or 1 to 1. Depending on the type of network design, replication typology can be: star, circle or hybrid.

Some of these solutions provide services for processing data for normalization of the schemes of the two databases. The advantages of these solutions consist of the ease of implementation and their default low cost. If the requirements of integration issue require both the integration of logic and methods of data processing, then integration solutions based on services have to be adopted.
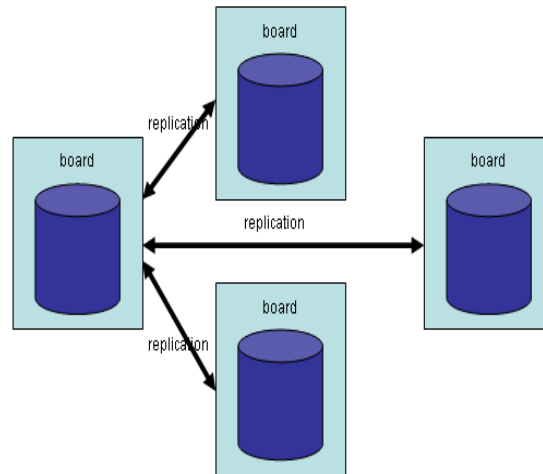
Fig 2 Replication process. Overview

b). Data federalization - consists of the integration of multiple databases and data models into a single unified data view.

Federalization involves development of a middleware level between different physically distributed databases and applications using these databases. This level is connected to the database using available interfaces and achieves an integration at a virtual database of existing databases. The advantage of data federalization is the possibility to group together different types of data in a unified model to support the exchange of data. The advantage of this model consists in the fact that it does not require changes to the source or destination applications. Yet small changes have to be done at application level in order to support federalization software, because each data model has different interfaces.

c). *interface processing* - these are well defined solutions for software packages or client applications integration. The Interest in ERP applications (SAP, PeopleSoft, Oracle applications) made the integration hub sites to support solutions for interface processing providing adapters for application packages integration or client applications. Integration of several types of applications represents the main advantage for this type of integration. It allows two synchronized systems that can use each other's applied logics.

The advantage of the method consists in the fact that in a long-term vision, the products from this category will be able to provide this type of access in an services-oriented vision.

3. INTEGRATION AT APPLICATION LEVEL

Applications integration involves several levels of integration: service-oriented integration, business process - oriented integration and portal - oriented integration.

a). service-oriented integration

Service-oriented integration allows applications to bring to a common denominator the business logic, allowing the exposure of functionality activities. It can integrate applications functionality in two ways: through creating new features that are technologically already available to be used as a services (or as integrated services), or through adopting an infrastructure that allows presentation as services for already existing functionalities.

Service integration is a concept identified in the client-server multi-level architecture (n-tier) or more recent ones, distributed in the form of a set of re-usable software modules. Recently a uniform mechanism for access to these services can be provided. The existence of a set of services, easily accessible,

containing business logic, allows reusing of business logic thus considerably reducing the number of redundant services and applications.

Using the infrastructure that allows the use of these services not only applications are integrated with the aim of data integration (information sharing), but it provides the infrastructure for reusing the business logics within cross-company processes (through a business-oriented process .

b). *Business Process Oriented integration*

Business Process Oriented integration is the mechanism for data and processes management in the correct way in order to support the management and implementation of common processes between applications. Business Process Oriented integration provides another layer of easily defined and managed centralized processes, that include within a structured set of subprocesses, processes and data in a lot of company applications. The aim is to bring together the important processes in a company or a number of companies to get the maximum added value, supporting the flow and logic control between these processes. Products from this category use middleware integration and provide easy to use visual interfaces for representation, composition and management of these processes.

In fact, solutions for integrating business processes are a supplemental level added to the existing integration solutions like: server integration, applications server, distributed objects and middleware levels. Integration based on business processes provide a tool to link separate processes and to develop process to process solutions. Business Process Oriented integration is a strategy, but at the same time a technology that increases the ability of companies to interact with different applications, integrating complete business processes, both inside and outside the company.

c). *Portal oriented integration*

Portal oriented integration allows viewing several systems, both internal and external, through a single user interface. It adapts the interface of each system to a common user interface (UI aggregate) which is very often a web browser.

As a result, all participating systems are integrated through the browser, even if the applications are not directly integrated inside or outside the enterprise. If other types of integration manage real time information exchange or by joining a model of joint processes and systems between companies, Portal oriented integration is trying to present data from a variety of systems through a single application or user interface. For these reasons this approach is not always considered as a strategy for integrating applications.

4. CONCLUSIONS

With the increasing number of applications that needed to be integrated, as well as cost and time of execution and maintenance, the implication of specialists in this field have been intensified, generating new techniques and technologies. Thus integration brokers appeared, developed as hub-spoke systems where the broker product represents the core and the spokes are applications that need to be integrated. Integration brokers have been developed including various models of communication and components such as: Business Process Management - BSM, work flow diagrams, support for Web services. They allow interaction with users outside the system. XML stood up as a standard for integration, allowing communication of data between heterogeneous databases and ensuring an integrated management of documents and processes, integration with existing applications and management of storage of XML files.

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