



Editorial

There is an ongoing debate between researchers of industries such as manufacturing and construction, and those of computer science (mainly Grid researchers) as to what constitutes a virtual organisation (VO). In this newsletter, we try to discern the difference between the two different viewpoints.

InteliGrid as we will demonstrate in forthcoming newsletters is acting as a bridge between the differing research communities and making available Grid solutions that are usable by VOs as seen by industries such as construction.

Do continue to visit our website to catch up on news, some of our results, and events of interest.

A.S. Kazi, dissemination manager

Virtual Organisation (VO)

One of a kind product or service delivery (e.g. construction of a building or facilities management) increasingly demands the one-time collaboration of different organisations to consolidate and synergise their dispersed competencies in order to deliver a desired product or service. This naturally has an implication not only in the way information (related to the to-be-delivered product or service) is exchanged and shared, but the way in which secure, quick to set-up, transparent (to the end-user) and non-intrusive (to the normal ways of work of an individual/organisation) ICT is used for this purpose. This has been a central research theme in various research initiatives (a listing of more than 100 European projects can be found by selecting "Virtual Enterprise" at <http://cic.vtt.fi/links/euproj/>).

The VO (also referred to as virtual enterprise or VE) is quickly becoming the preferred organisational form for

one-of-a-kind-settings to deliver a one-of-a-kind product. Needless to say, the term itself has been a popular one in recent research undertakings. Some definitions follow:

- "... consists of a series of co-operating 'nodes' of core competence which form into a supply chain in order to address a specific opportunity in the market place" (Walton and Whicker, 1996)
- "... materialize by selecting skills and assets from different firms and synthesizing them into a single business entity" (Camarinha-Matos et al, 1998)
- "... geographically distributed, functionally and culturally diverse, dynamic and agile organisational entities linked through ICT" (Hannus and Kazi, 2002)

Typical VO Lifecycle Stages

A virtual organisation typically goes through four distinct lifecycle stages (Hannus, et al, 2004) as shown below:

Identification/conception

This stage typically begins upon a specific/unique client need for a product or service that a single organisation cannot deliver. It serves as a

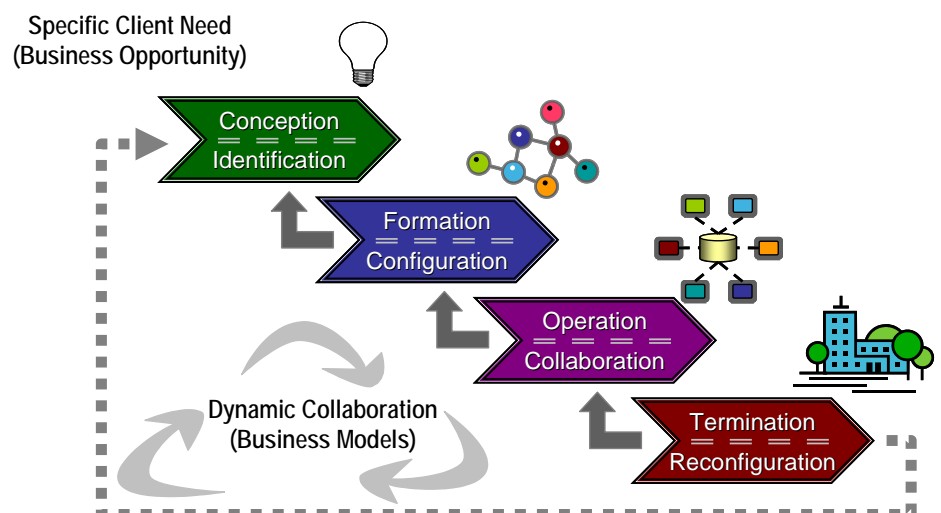
business opportunity for a set of organisations that will combine competencies to deliver the product and/or service that the client needs. A client in such an instance may either contact a single organisation (who will then look into building a VO consortium), or alternatively contact a set of organisations and ask them to form the consortium (VO) to deliver the product and/or service).

Formation/configuration

This stage focuses on the establishment of the VO in terms of role definitions (who does what), definition of information flow mechanisms, identification of information exchange formats and modalities, interoperability of inter-organisational tools, shared resource and services definition and configuration, etc. In most instances, during this stage, there is minimal time available for the set-up and configuration of the VO. This can at times serve as a bottleneck when no solution exists for sharing data across different applications.

Operation/collaboration

This is the main stage of a typical VO where different VO tasks are carried out in parallel and series based on task needs. While in some cases a certain degree of business process control can



be exercised (some predefined business processes), in most instance all that can be monitored may be limited to transaction monitoring. Within this stage there is a significant degree of work taking place within a distributed (engineering) setting with the possibility of some partners leaving and others joining as per need of the VO. To ensure work within such dynamic environments, the importance of compliance to or interfaces to shared data exchange formats and standards cannot be over emphasised.

Termination/reconfiguration

When a VO consortium has completed delivery of the required product/service, it is terminated or reconfigured to form another VO to continue (e.g. from a VO that develops a product to a VO that provides maintenance or service for a product). During this stage, it is very important to have in place proper mechanism for archiving of the data/information that has been used, and produced during the operation and collaboration stage. This not only preserves and provides audit trailing on the work that has been accomplished, but also serves as the baseline for the “follow-up” VO. As an example, in the AEC sector, an “as-built” model of the building can be provided to allow for facilities management of the completed building.

Salient Characteristics

The salient characteristics of a VO can be summarised as:

- Not necessarily a legal entity
- Some members are not known in advance
- Collaboration between participants in VOs is temporary
- Complementary competence is provided by distinct organisations
- Information flows are not necessarily covered by contractual relationships
- There is an absence of dominant actor to set up the rules of the game
- Members may participate in several other concurrent VOs

Grid

Before exploring how a Grid sees a VO, it is best to understand Grid technology first. Here are some definitions:

- “Grids are persistent environments that enable software applications to integrate instruments, displays, computational and information resources that are managed by diverse organizations in widespread locations.” (<http://www.globus.org>)
- “A Grid is...a hardware and software infrastructure that provides dependable, consistent, and pervasive access to resources...to enable sharing of computational resources, utility computing, autonomic computing, collaboration among virtual organizations, and distributed data processing, among others.” (Wolfgang Gentsch, Director Grid Computing, Sun Microsystems)

The Grid View of a VO

The Grid Community sees a VO differently from what is traditionally known as a typical VO. This is perhaps best understood through the following:

“The sharing that we are concerned with is not primarily file exchange but rather direct access to computers, software, data, and other resources, as is required by a range of collaborative problem solving and resource-brokering strategies emerging in industry, science, and engineering. This sharing is, necessarily, highly controlled, with resource providers and

consumers defining clearly and carefully just what is shared, who is allowed to share, and the conditions under which sharing occurs. A set of individuals and/or institutions defined by such sharing rules form what we call a virtual organization.” (Foster, et al. 2001)

The “VO” Vs. the Grid VO.

The table at the bottom of this page makes an attempt to discern the differences between the two perspectives to the VO. As may be noticed, while the “traditional” VO centres on organisations and competencies, the “Grid” VO centres on computing resources and capacities.

VO Expectation from Grid

There is ample that a typical VO can expect from a Grid solution for a “typical” VO. Below are some functional and technical expectations.

Functional expectations:

- Quick set-up and configuration
- Reliance on standards and/or interfaces to standards
- Ease of use
- Integration with legacy tools
- Role based rights management
- Information and transaction archiving
- etc...

Technical expectations:

- Handling of any data types
- Object oriented model handling
- Dynamic service integration and method invocation
- Language independence
- Security
- etc...

The (traditional) “Real” VO	Grid for VO
Organisations are the nodes	Organisational ICT systems are the nodes
Competence sharing	Capacity sharing (computing, storage, resources)
Distributed team work and collaboration	Distributed parallel computing and processing
Information & contract flows not necessarily aligned	Information flows based on “resource” availability contract
Common (shared) repositories and services (VO environment)	Distributed objects and applications (Grid “spider web”)
Interfaces to standards and proprietary applications	Grid middleware is the interface to everything!
Functional solution to a business need	Technical packaging of technical solutions

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