

NETWORK MANAGEMENT TO SUPPORT VIRTUAL TEAMS WORK FOR PROJECT DEVELOPMENT AT THE ENTERPRISE LEVEL

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Abstract: In the 21st century, the enterprises continuously implement IT strategies & architectures to improve manufacture, research, products quality, sales, and services and to control costs. All enterprises have now a local area network, an intranet or/and Internet, servers and workstations for operations, administration and management working together for the same objective: profits. In this paper we describe the virtual teams work support for project development and network management for an enterprise geographically dispersed.

Key words: enterprise, network management, virtual team, project development.

1. INTRODUCTION

Whether organizations are composed of one enterprise or many enterprises (holding), for survival, is necessary to learn from the past, supervise the present and plan the future. An important factor for the enterprises in the products and services development is to know to establish, to translate and to define the customer requirements using quality methods, tools and techniques. Today, the enterprises use Internet or Internet technologies to attract, retain and cultivate relationships with customers, streamline supply-chain, manufacturing, procurement systems and automate corporate processes to deliver the right products and services to customers quickly and cost-effectively, also to capture, explore, analyze, and automate corporate processes information on customers and company operations in order to provide better business decisions [1].

New enterprise model architecture using Intranet/Internet/Extranet infrastructure and technologies is presented in Fig. 1 [2, 3] in a general aspect.

For business, e-service is going to be a new way to save money, to revenue growth, and faster development model. For end-users, e-services increase productivity and simplify life, take advantage of more sophisticated and specialized services on as needed basis. At the level of production-dedicated enterprises, e-services are (see

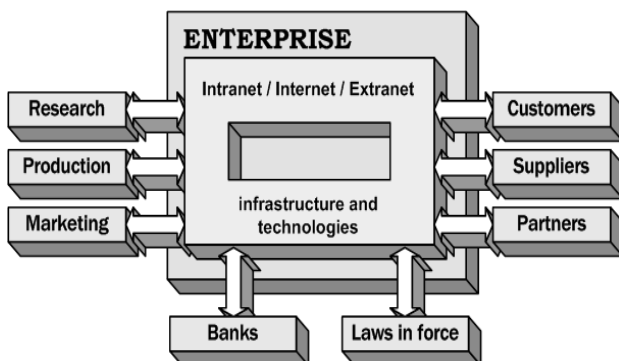


Fig. 1. New enterprise model architecture.

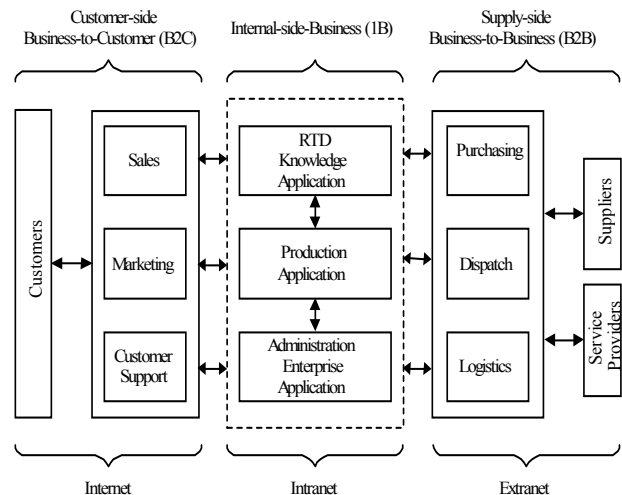


Fig. 2. The exchange of information services and goods through networks.

Fig. 2): business-to-business (B2B), intra-business (IB), and business-to-customer (B2C) [4, 5, 6, 7].

As a general requirement for this infrastructure support is that the companies must be able to inter-operate and exchange information's and knowledge in real time so that they can work as a single integrated unit, although keeping their independence/autonomy.

In a real meaning, an e-business is any business that uses Internet or Internet technologies [4] to attract, retain and cultivate relationships with customers, streamline supply-chain, manufacturing, and procurement systems and automate corporate processes to deliver the right products and services to customers quickly and cost-effectively, also to capture, explore, analyze, and automate corporate processes information on customers and company operations in order to provide better business decisions [6]. For the future, e-services and e-business [5], as were defined, require the enterprise re-thinking and re-modeling, with the system and applications design for an efficient use of new network technologies.

The perspectives [6] of this kind of manufacturing and economy, named shortly new digital economy, we can see the product perspective (holistic product view, product life-cycle, value-network integration, etc.), business organizational perspective (new organizational form, customers and suppliers integration, collaborating organization etc.), the technology perspective (technological building blocks, infrastructures, interoperability etc.) and the individual perspective (skills, workspaces, collaborating individual, different rolls: worker, consumer, citizen).

As a general requirement for an infrastructure to support virtual enterprise it can be underlined that the companies must be able to inter-operate and exchange information in real time so that they can work as a single integrated unit, although keeping their independence/autonomy. A complete redesign of an existing enterprise to converged enterprise would represent a big effort, not justifiable in market terms as companies are not replacing easily their running systems.

A better strategy is to try to separate the internal functionalities from the network-related ones and develop the necessary mappings to legacy systems, to correspond to the new aggregator model for modern electronic commerce.

2. VIRTUAL TEAMS WORK

The range of software tools and technologies available to support collaborative design activities is growing dramatically. The deployment of these tools and technologies opens up the possibility for establishing virtual design offices that bring together people from the entire design network: making the right decisions at the right time enabled by the right conversations supported by the right tools and information [4].

However, the vision, skills and competencies needed to exploit such technologies are cross, disciplinary and the critical mass needed to exploit such tools is not readily accessible within many organizations. In addition, the resource cost of using these tools and technologies to support designers carrying out distributed design processes is often significantly greater than the cost of acquisition. It is not surprising that the potential offered by the research into and creation of collaborative tools remains untapped. Each of the virtual design offices was created using only commercially available software and hardware.

Virtual teams for engineering design are becoming more commonly used in industry and the engineering education community must prepare graduates to be employed in such work environments. It is inevitable that multidisciplinary teams for product design, with members located in different geographic locations, will become more commonplace in the future. It is widely understood that successful design is often a highly collaborative team based activity. To be effective, a virtual team must be able to communicate, collaborate and coordinate, all at distance.

Though some corporation are practicing a form of distributed design, a documented procedure for conducting distributed design and product development has yet to be created, tested and distributed. However, the same

set of skills that guide design teamwork for a team where all members are in one location is different from that set of skills needed to lead virtual team.

The term "virtual team" is a misnomer as although it makes reference to virtual reality and the concept of creating a Virtual space that can be experienced it also suggests that the virtual team isn't actually a team and as such can lead to a loss of performance. In the initial stages it became clear that whilst a distributed computer based-platform could support distributed teams it could not completely replace face-to-face contact [8].

The reasons behind this are complex but lie largely in the operational cultures of the organizations and individual apprehension to the process of decision-making and conflict resolution in a distributed environment. In particular it is recognized that face-to-face contact at the beginning of a project leads to significant advantages in the areas of building trust, establishing the team working methods and communications protocols, and defining a common vision of the product.

This presented an opportunity to explore how collaborative tools and technologies can be used to support the gathering of distributed teams within a co-located environment for key decision making sessions.

To illustrate the infancy of distributed virtual design, the method of distributed team members working on any project currently lacks a universal name. Terms such as virtual teams, collaborative learning groups, geographically and temporally dispersed teams, globally distributed teams, distributed design, e-design and e-teams are all used to describe various Internet based design activities. In this case a design team is formed with members located at different geographic locations [10].

A virtual local area network is created for the project (see Fig. 3). In addition to the team's full-time members, the team also includes contributing members who are recruited for specific components of the project. As such, a core group is responsible for leading the project and a sub-group is involved in specific components of the project. While the full time employees form the central core of the team, experts in the different problems of the project (control systems, mechanic systems, electronic systems, programmer's etc.) are also team members. With such an organization the virtual team needs to communicate on two directions: one direction being the core member system of the team and the second direction being the less involved subject matter experts.

For this system, the design process would include defining and understanding the problem, developing a strategy to solve the problem, determining possible solutions, creating concepts for the system's subcomponents, building virtual prototypes of the subcomponents, detailed design of the subcomponents and finally fabrication, integration and testing of the virtual completed system.

This process is the compilation of a number of existing design processes, which work well for team-based projects. Using this system of the design process, the virtual team members would be required to work independently yet constantly communicates concerning interfaces and logistics. Like teams with members in the same location, the virtual team must not only solve the problem at hand but also manage itself and its information.

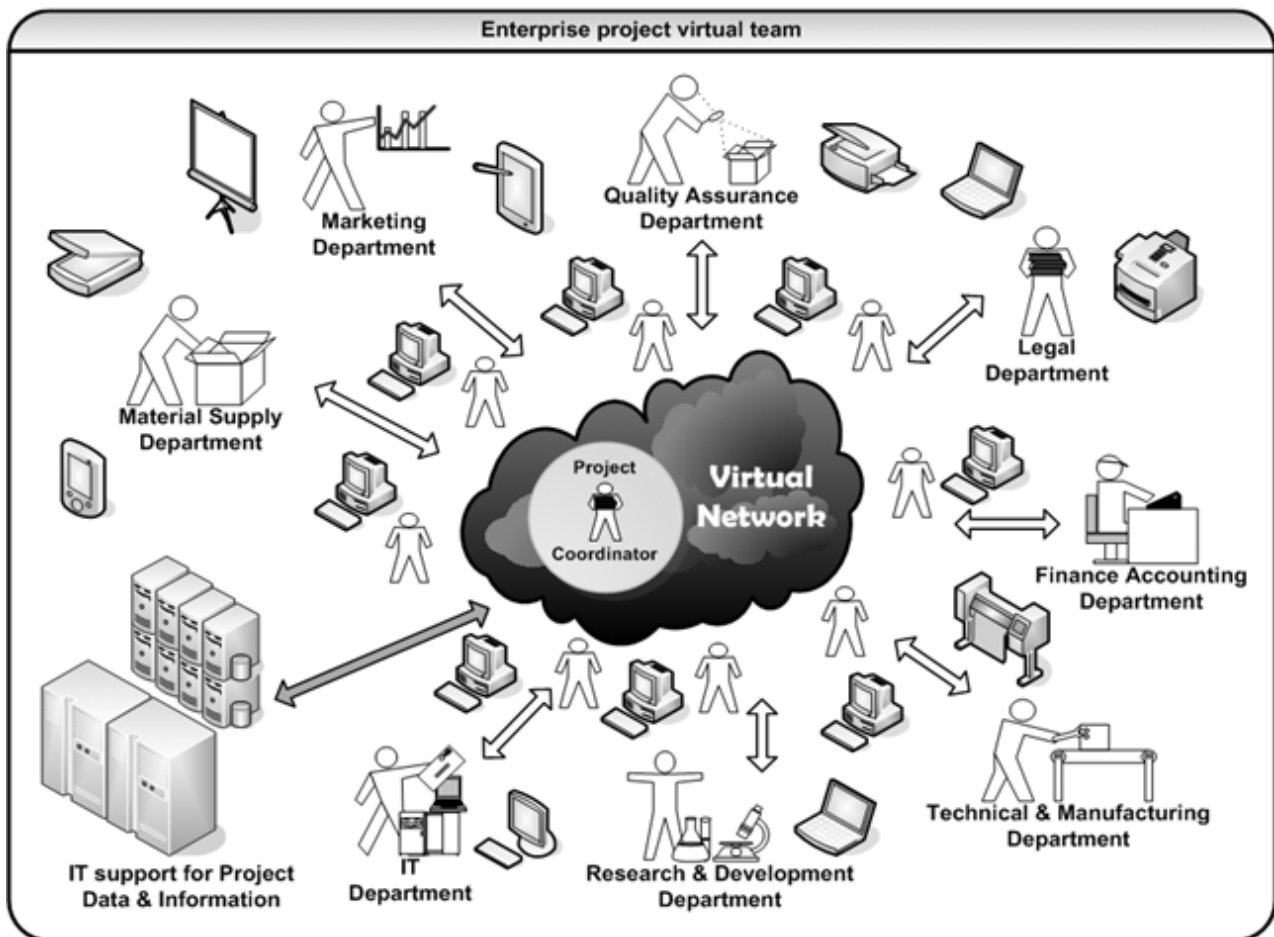


Fig. 3. Enterprise virtual team for project development [11, 12].

Also, to ensure the success of virtual teams, the participants need collaboration tools, an articulated project management philosophy, and support tools to train members and direct the process. A set of communication tools must be adopted and the team members must be trained to use of the tools and the solutions process. Most importantly, the team leadership must closely manage the entire process.

The Web (World Wide Web) has drawn together previously, separates activities and integrated them under a common framework [6]. Like a most revolutionary technologies, the Web permanently changed the nature of networking.

It supports convergence of content delivery over networks and the Web is to content delivery what backplane buses are to computer systems.

Formerly, distinguish activities are undergoing integration into a common framework. Integration is occurring at a number of different levels most noticeably at the application level where users expect ease of use between different application as well as applications that incorporate a diversity of data types such as documents that embed spreadsheets, graphics and voice annotation.

Users are showing interest in solutions that provide a diverse range of functionality in a single network (voice, data, video integration) and offer the possibility of reduced cost, i.e. less capital equipment acquisition, less need for a range of technical experts in different areas, etc.

As the market for call centres on converged networks matures, customers will require even tighter integration of the centre with the rest of their business. Most important Web-based collaboration tools for virtual design offices include [10]:

- project discussion forum;
- project file depository;
- real-time data exchange;
- instant messaging (i.e. with voice and e-mail);
- training and project management documentation.

The communications and information infrastructure are the key components of the Internet/Intranet/ Extranet collaboration toolbox [7].

Also, the archived documents from these collaboration tools become the digital documentation of the teams design decisions and serve at a historical record of the design process. In addition, real-time file sharing is a necessity for successful virtual teams.

With real-time file sharing, individual users can view the shared document on their screen, manipulate the files, and have the results immediately viewed by remote team members. But, the availability of web collaboration tools is not enough to ensure the success, and also the virtual teams require, like all teams, a proper leadership and a management to establish clear objectives, define project procedures and team communication and collaboration [9, 10]. Virtual project management technique as well as additional guidance

to keep the distributed team informed and engaged. Before the virtual team project begins, the team must establish a management system, articulate the team's organization and develop a plan for operations. Also, in addition to the web collaboration tools, the virtual team must establish and apply the most important management tools [4]:

- Project overview;
- Roles and organizational structure;
- Web collaboration tools training handbook;
- Team update communications and contact information;
- Daily project plans and assignments.

The best solution is a core leadership group. It is responsible for managing the entire project and members of the leadership core are active participants in the design activities. For example, the overall team leader might manage all aspect of the team and serve as the lead for the control system problems of the design group.

Similarly, the individual coordinating the many aspects of information technology could also be the lead member of the software team of the design group.

3. ENTERPRISE NETWORK MANAGEMENT

The enterprise can development permanently project with virtual tem support if have a good network management. Information Technology Department has this role at the enterprise level. A solution is to use a host and service monitor designed to inform as of network problems before your clients, end-users or managers do.

A system and network monitoring application is Nagios®. This software is licensed under the terms of the GNU General Public License Version 2 as published by the Free Software Foundation (GNU General Public License is a free, copy left license for software and other kinds of works). This gives you legal permission to copy, distribute and/or modify Nagios® under certain conditions.

Some of the Nagios features include [13]:

- Monitoring of network services (SMTP, POP3, HTTP, NNTP, PING, etc.) – see in Fig. 4 traffic statistics.
- Monitoring of host resources (processor load, disk and memory usage, running processes, log files, etc.).
- Monitoring of environmental factors such as temperature.
- Simple plug-in design that allows users to easily develops their own host and service checks.
- Ability to define network host hierarchy, allowing detection of and distinction between hosts that are down and those that are unreachable.
- Contact notifications when service or host problems occur and get resolved (via email, pager, or other user-defined method).
- Optional escalation of host and service notifications to different contact groups
- Ability to define event handlers to be run during service or host events for proactive problem resolution.

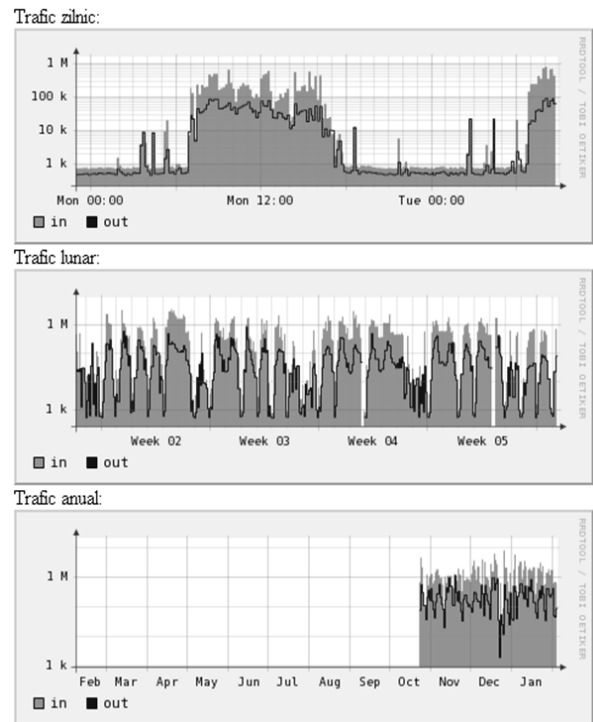


Fig. 4. Nagios® traffic statistics.

- Support for implementing redundant and distributed monitoring servers.
- External command interface that allows on-the-fly modifications to be made to the monitoring and notification behavior through the use of event handlers, the web interface, and third-party applications.
- Retention of host and service status across program restarts.
- Scheduled downtime for suppressing host and service notifications during periods of planned outages.
- Ability to acknowledge problems via the web interface.
- A Web interface for viewing current network status, notification and problem history, etc.
- Simple authorization scheme that allows you restrict what users can see and do from the web interface.

A large organization (or an industrial holding) geographic dispersed who have many enterprises and/or agency was designed in figure 5, and for a good operating was choice 2 providers for each centre.

In this new era of information, wealth fundamental sources are knowledge and communication, not natural resources or labor work.

Informational society construction can't be realized without a research and investment project in IT&C and educational field. In that direction, the enterprise must be certainly made for their employees to be able to assume quickly new abilities, using old ability, and they can assimilate big information quantity about new products, technologies, market, competitors, as well as if employees can be reoriented, specialized to others interest domain.

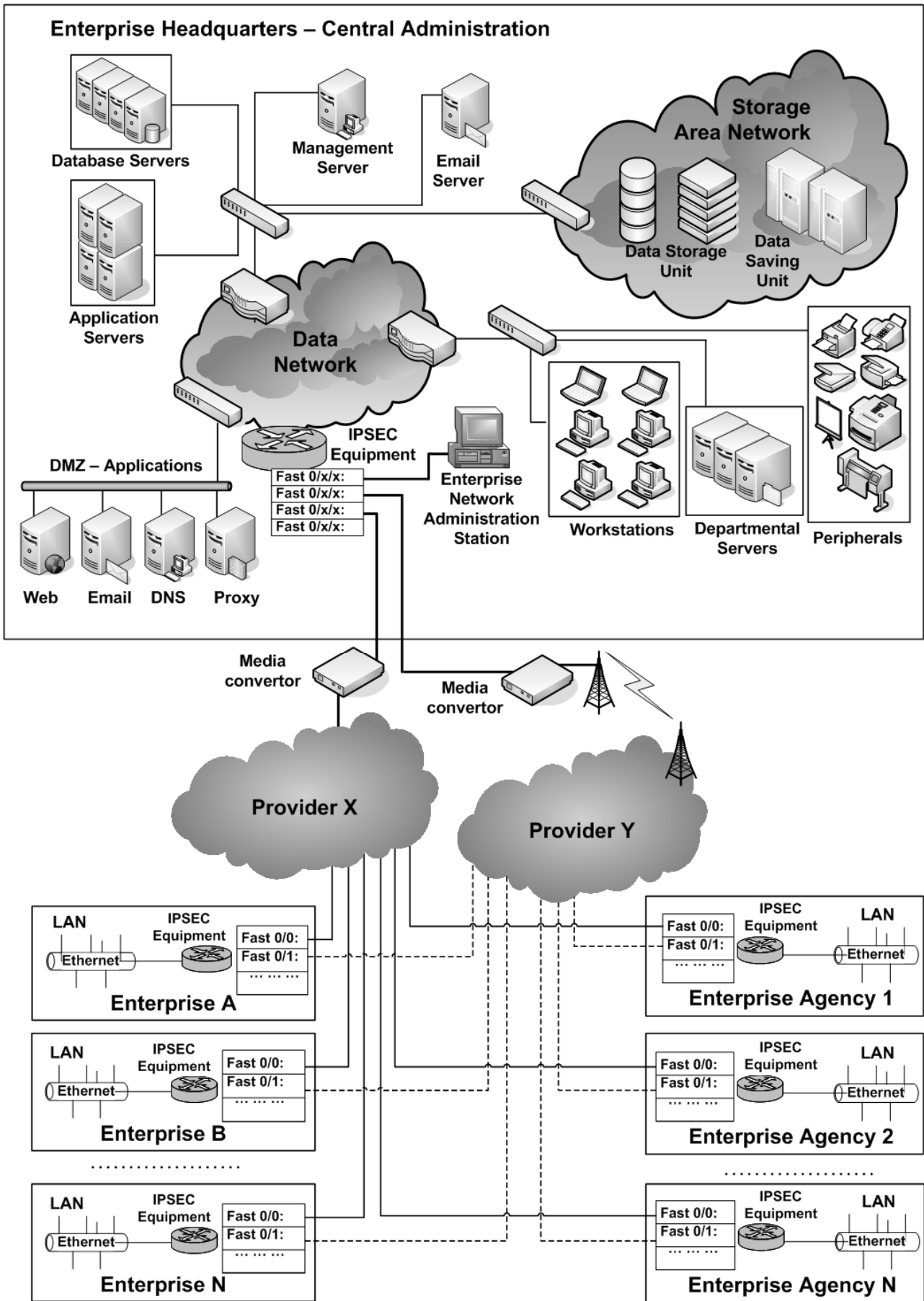


Fig. 5. A network for an enterprise geographic dispersed.

4. CONCLUSIONS

Activities improvement is a priority in all enterprise. Network management represent the activities, methods, procedures, and tools (software and hardware) that pertain to the operation, administration, maintenance, and provisioning of networked systems. We present here a collaborative work at the enterprise level through virtual teams for project development and a network for large enterprise geographic dispersed was designed. Also, we present a solution for an enterprise network management.

The concept of collaborative work has emerged both as an effect of globalization and as a prospective tool for enabling this new business approach.

The opportunities and limitations presented by collaborative design, however, are not well understood, and the actual gains of applying collaborative design are not clear.

A survey of recent collaborative design research shows a focus on developing tools to facilitate communication of ideas and information within collaborative design teams.

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