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Virtual Social Networking and Interoperability in the Canadian Forces Netcentric Environment

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Abstract

In joint, coalition, and multi-agency operations, where component members are physically dispersed and culturally and operationally diverse, it is not uncommon to find that members are not familiar with the roles, expertise, and expectations of partnering units or organizations. Developing shared awareness and a high degree of interoperability in this distributed, anonymous environment necessitates appropriate tools to assist teams in collaboration and information sharing, and in localizing resources and expertise. In the corporate and public worlds a relatively new class of communication called virtual social networking (e.g., Facebook, LinkedIn) is quickly taking over more traditional information sharing methods, such as email and chat. Virtual social networking represents evolutionary progress in disseminating information via the internet and its dynamic basis provides a rich forum for sharing information, for uncovering sources of expertise, and for developing extensive virtual connections between individuals and between groups. A research program has been initiated at Defence Research and Development Canada to investigate the requirements and feasibility of implementing this kind of web-based social networking with the Canadian Forces. This paper describes results from the first phase of the project, wherein social networking applications currently used by public and private organizations were explored with respect to composition, content, and use.

Résumé

Dans les opérations interarmées, coalisées et pluriorganisationnelles faisant appel à des partenaires physiquement éloignés les uns des autres et différents sur le plan culturel et opérationnel, il n'est pas rare de constater que les participants ne sont pas familiarisés avec les rôles, l'expertise et les attentes des unités ou organisations partenaires. Pour développer une compréhension commune et un niveau élevé d'interopérabilité dans cet environnement anonyme réparti, il faut pouvoir compter sur des outils appropriés afin que les équipes puissent collaborer entre elles, partager l'information et localiser les ressources et l'expertise requises. Dans le monde des affaires et le secteur public, un outil de communication relativement nouveau, appelé réseautage social virtuel (p. ex. Facebook, LinkedIn), vient rapidement supplanter les méthodes de partage d'information plus classiques, comme le courriel et le clavardage. Le réseautage social virtuel représente une évolution dans la diffusion d'information par Internet, et sa base dynamique crée une riche tribune pour le partage d'information, la localisation de sources d'expertise et l'établissement de liens virtuels étendus entre personnes et entre groupes. Recherche et développement pour la défense Canada (RDDC) a lancé un programme de recherche pour étudier les exigences et la faisabilité de mettre en œuvre ce genre de réseautage social basé sur le Web au sein des Forces canadiennes. Ce rapport décrit les résultats de la première phase du projet, au cours de laquelle on a analysé la composition, le contenu et l'utilisation des applications de réseautage social utilisées actuellement par les organisations des secteurs public et privé.

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Executive summary

Virtual Social Networking and Interoperability in the Canadian Forces Netcentric Environment:

Sylvain Pronovost & Gerald Lai; DRDC Atlantic CR 2009-090; Defence R&D Canada – Atlantic; July 2009.

Introduction

A relatively new collaborative tool for connecting individuals when they are not co-located is web-based (virtual) social networking. The dynamic basis of this type of software application provides a rich forum for networking, for sharing information, and for locating sources of expertise. Virtual social networking has been rapidly and confidently accepted in the business and recreational worlds and the Canadian Forces is interested in the usefulness and feasibility of implementing this kind of application in the military domain. This mechanism for collaborating and sharing information could be particularly useful in distributed networked environments, such as joint force and multi-agency operations, where component members are physically dispersed and where individuals may not be familiar with each other.

DRDC Atlantic is conducting research to examine the human performance implications of using virtual social networking as a collaborative communication tool in the military domain. This report describes the first phase of the work; in which a taxonomy of existing virtual social networking applications was developed. In addition, a number of tools for analyzing the links formed in social networks were identified.

Results

A taxonomy of existing virtual social communities was established by cross-referencing social networking sites from primary sources, information technology reviews online, and pre-existing taxonomies available from Wikipedia articles.

Significance

Having identified the format of existing social networks, these results will contribute to the development of a prototype software application to be used for empirically evaluating the effects of virtual social networking on human performance in the context of information sharing, locating sources of expertise, and building trust within and between netcentric units.

Future plans

This work is the first step in a research program aimed at gaining a deeper understanding of the impact and implications of virtual social networking in the military operational domain. Future work entails conducting requirements analyses on military communities, developing a virtual social network software application, and carrying out human performance experimentation.

Sommaire

Réseautage Social Virtuel et Interopérabilité dans l'Environnement Net-Centrique des Forces CanadiennesVirtual:

Sylvain Pronovost & Gerald Lai; DRDC Atlantic CR 2009-090; Defence R&D Canada – Atlantic; July 2009.

Introduction

Le réseautage social (virtuel) sur le Web est un outil de collaboration relativement nouveau permettant de relier les personnes lorsqu'elles ne sont pas colocalisées. La base dynamique sur laquelle repose ce genre d'application logicielle crée une riche tribune pour le réseautage, le partage d'information et la localisation de sources d'expertise. Le domaine des affaires et celui des loisirs ont accepté rapidement et avec confiance le réseautage social virtuel, et les Forces canadiennes veulent déterminer la pertinence et la faisabilité de mettre en œuvre ce genre d'application dans le domaine militaire. Ce mécanisme de collaboration et de partage d'information pourrait s'avérer particulièrement utile dans les environnements réseau répartis, comme c'est le cas lors d'opérations interarmées et pluriorganisationnelles faisant appel à des partenaires physiquement éloignés les uns des autres et à des participants qui ne se connaissent probablement pas entre eux.

RDDC Atlantique effectue des travaux de recherche pour évaluer les conséquences que l'utilisation du réseautage social virtuel, comme outil de communication et de collaboration, pourrait avoir sur le rendement humain dans le domaine militaire. Ce rapport décrit la première phase des travaux, au cours de laquelle on a élaboré une taxonomie des applications de réseautage social virtuel existantes. De plus, on a identifié un certain nombre d'outils permettant d'analyser les liens formés dans les réseaux sociaux.

Résultats

On a établi une taxonomie des communautés sociales virtuelles existantes, en vérifiant la concordance des sites de réseautage social à partir des sources primaires, des revues en ligne des technologies de l'information et des taxonomies existantes disponibles dans des articles Wikipédia.

Portée

Une fois identifié le format des réseaux sociaux existants, ces résultats contribueront au développement d'un prototype d'application qu'on utilisera pour l'évaluation empirique des effets du réseautage social virtuel sur le rendement humain dans le contexte du partage d'information, de la localisation de sources d'expertise et de la mise en place d'un climat de confiance au sein des unités netcentriques et entre celles-ci.

Recherches futures

Ces travaux constituent la première étape d'un programme de recherche visant à mieux comprendre l'incidence et les conséquences du réseautage social virtuel dans le domaine opérationnel militaire. Les travaux futurs porteront, entre autres, sur l'analyse des besoins dans les communautés militaires, le développement d'une application logicielle de réseautage social virtuel et l'évaluation du rendement humain dans le cadre d'essais.

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1 Introduction

1.1 Background

The nature of today's Canadian Forces operations involves joint operations, multi-national coalitions forces, and inter-agency organizations, working together within a networked environment. Sharing and managing information from multiple sources and different cultures, and developing integrated teams across time and space, brings unique challenges to interoperability. Within the military domain there is much we do not know, nor can anticipate, about the ways in which networking distributed multi-cultured teams together affects individual and organizational behaviour and performance. As such, it is essential to understand the issues surrounding the human dimension of networking groups in high intensity and unstable environments like those experienced by the Canadian Forces and to provide appropriate resources and tools to support operators in their roles.

One of the key questions that arises within a diverse, multi-team operation is 'who knows what?'. An awareness of what other team members know, and how to access the information that makes up a team's collective knowledge base, has been termed transactive memory [1, 2], and research shows it is an essential factor in team performance [3], and subsequently in mission outcome. Unlike a shared mental model, whereby team members share common knowledge and information, transactive memory refers to a group-level collective system of knowledge and the awareness and understanding of team members about where to find the source of specific expertise within a team, or team of teams [4]. A distributed knowledge system serves to reduce individual cognitive load, enlarge the collective pool of expertise, and minimize redundancy. Furthermore, since situation awareness is a basic component of good decision making [5], depending to a large degree on the information available, operational component members need to find sources of expertise quickly so that information can be accessed and delivered in a timely manner.

A variety of web-based tools are available to support virtual collaboration and information exchange and many of these means are used routinely in the recreational and business worlds. The Canadian Forces must ensure that those technologies available to the public are not overlooked or prematurely dispensed with as we work towards ensuring a military force that is technologically advanced and network enabled. But the military domain is a unique one, and new technologies should not be implemented without appropriately investigating the implications and requirements, as well as identifying any modifications required to fit the military environment. As an example, this sort of upfront work was overlooked in the late 90s when the advent of chat and email networks hit the relatively unprepared Navy. While enthusiastically embraced as a major advancement in communications by military personnel on board ship, both within a Canadian Task Group and with Coalition partners, unexpected side effects in the management of commands and traceability of actions were apparent. Efforts to use chat logs to reconstruct Command and Control flows were initially found to be nearly impossible. However, in spite of these

problems, chat is a valuable communications tool, and it is currently used extensively as a means of communication between Canadian Forces platforms.

Taking a proactive approach, a research program has been initiated at Defence Research and Development Canada - Atlantic to investigate the requirements and feasibility of implementing web-based social networking within the Canadian Forces. This report describes results from the first phase of the project, wherein social networking applications currently used by the general public and by private organizations, were explored with respect to composition, content, and use.

1.2 Web-based collaborative tools

Following are some of the more common web-based collaborative tools:

- Electronic mail (email) – means of communicating and storing primarily text-based messages
- Chat – text-based conversational script
- Blogs – (weB)log – regular entries of commentary
- Wikis (Wikipedia) – multiple editors, create/link websites
- Portals (Yahoo, Orbit, COPlans, DRDC COP21) – web point of access to various services
- Search engines (Google) – information search
- Social bookmarking (delicious) – shareable web page bookmarking
- Social tagging – user-based rating
- On-line forums (runningmania.com) – message board
- RSS feed – publish updated sites
- Twitter – asynchronous status updates/ blogging

All of the tools in the above list support information exchange in one way or another, and some of them are useful or potentially useful for locating specific resources or sources of expertise. Search engines, however, have limitations, particularly when it comes to sharing information between parties. The limitations of this type of tool become especially apparent in an environment where the complexity and diversity of an operation means a vast amount of, possibly unfamiliar, information must be made available to team members who are physically distributed. Realistically, in a multi-agency military operation, the diversity of the organizations and the team involved may make defining what is required by specific individuals at a particular time exceedingly difficult. Although users may not always know what specific information they need, search engines require users to have some idea of the information for which they are looking. Furthermore, the search process is time consuming. Once a search is complete, results have to be parsed to extract references that are most likely to be of value, and to discard those that are not. Subsequently, a selection of who to distribute and share the saved

material with must be made. Decisions like these require that the user know, to a fair degree of depth, who they are working with, what their roles are, what their current state is, and whether or not they would find the information useful. In this entire effort, each user is on his own, meaning that an individual's effort is a non-shareable investment – although final results can be shared, the intrinsic effort cannot. If another individual needs the results of a similar search he or she must conduct the same series of search steps independently.

Search engines, and many other web-based tools listed, like blogs, wikis, portals, social bookmarking, on-line discussion forums, email, and chat, are limited in that they are pull-based mechanisms for finding and exchanging information – they all require direct action on the part of the user and they require that the user know in advance the type of information sought, and/or the source of that information, and/or appropriate recipients.

1.3 Virtual social networking

Tools supporting collaboration continue to develop and mature and in the corporate and social worlds many of the more traditional methods for exchanging information have been replaced with a new class of communication mechanism called virtual social networking. Social networking applications were not designed to replace search engines but they do overcome many of the limitations in finding and sharing information.

In some businesses, and in the university community, the traditional form of communication, email, has been almost completely superseded by virtual social networking. Facebook, for example, has grown in 3 short years from a college student network to a world-wide general population community of over 67 million [6]. This new approach to information exchange has a large push-based component and it overcomes many of the boundaries of existing web-based collaborative tools that are primarily pull-based. In the world of information sharing social networking represents evolutionary progress in disseminating information via the internet. Not only are these applications effective for information sharing and finding individuals with specific expertise, but one of their greatest strengths is that areas previously unknown to the user become familiar, and sources of expertise, resources, and information that the user might otherwise have been unaware of are brought to light and are easily tapped into.

A social network constitutes connections (ties) between nodes (individuals) that share an incentive to link together, examples of which might be friendship, common values, interests, ideas, expertise. The shape of this network of interpersonal ties can determine its usefulness to members. Small, tight networks are made up of strong close ties. Members move in the same circles (e.g., a group of friends) and are relatively familiar with each other, having similar interests and shared experiences. Thus, knowledge shared within tight networks is usually not novel in nature. In contrast, loose networks, although they may contain a sub-network component of close connections, are generally made up of more distant relationships such as acquaintances, friends of friends, colleagues of colleagues. These relationships constitute weak links and the overall network size is typically larger than tight networks. Because of the basis of loose networks, connections

to other social worlds are likely which in turn can give members access to a wider range of information. In some domains, such as the business world, individual success can benefit from being connected to a variety of networks rather than having many connections within a single network. Similarly, individuals can exercise influence or act as brokers within their social networks by bridging two networks that are not directly linked, referred to as filling structural holes.

1.4 Virtual social networking and distributed teams

The dynamic mechanism of social networking provides a rich forum for sharing and finding information and for developing extensive connections that not only facilitate practical information exchange but may also promote team cohesion. A well integrated, communicative team is fundamental to developing shared awareness - an essential team component [7, 8]. Yet when team members are distributed, and may be diverse, integrating team members into a unit with a common goal can be a challenging process. Research shows that face-to-face interaction leads to greater levels of trust than distributed interaction, and trust is fundamental to team development [9]. Because of its push-based nature, the networking capability of virtual social networking may facilitate aspects related to team formation and overall team performance, such as communication, trust, cooperation and collaboration. The passive features of virtual social networking improve and enhance “common ground” and “team situational awareness” even by enabling simple things such as access to shared user-contributed content, such as profile information, specific knowledge (e.g. resumes, web logs, etc.), and general social network inputs by users [8, 10, 11].

1.5 Virtual Social Networking and the Military

In order to stay abreast of modern technology and practice the Canadian Forces must understand the implications and requirements for web-based applications commonly used by industry and the public as they apply to military and multi-agency/unit domains [12]. The popularity and success of virtual social networking in the business and recreational worlds strongly implies that this type of collaborative application could play an important role within the large, netcentric world of the CF, where working with, and understanding other national and multi-national organizations is critical.

Defence Research and Development Canada is taking a proactive approach to investigating virtual social networking and other web-based collaborative tools, with the goal of determining their relevance and impact on the Canadian Forces, particularly in operations where teams are physically separated and unfamiliar with the expertise and knowledge of other component members. The project as a whole involves several work areas that include researching existing virtual social networking applications; defining requirements for the CF; assessing the use of social networking and the web-based tools in a user testing environment, and conducting empirical research on human performance using virtual social networking applications. This paper reports on findings from the first phase of the project, which is to gain an understanding of the kinds of virtual social networking tools that already exist and to acquire knowledge with respect to how they are

being used, by whom, and for what purpose. In conjunction, the work also identifies other communication and collaborative web-based tools that might be used as modules to enhance the overall capability of the social networking applications in the military domain (e.g., email, chat, wikis, etc.).

1.6 Method

Information about virtual social networks was acquired via exploration of web content using the following specific means:

- Social tagging – user-based rating
- Digital journals, such as the CNET.com and Wired.com which are specialized in providing information about the high technology sector, including information technology, science, etc.;
- The Wikipedia online encyclopedia, which is a consensus-based editorial process sometimes criticized by credentials-based supporters, but is nevertheless a source of the most up-to-date information on novel trends and products regarding information technology;
- Primary references acquired by searching virtual communities, social networks, and collaborative "Web 2.0" sites, where biased yet specific information can be acquired on demographics, users, traffic, functionalities, etc.;
- Web and traffic analytics data from sources such as Google Analytics and Alexa Internet;
- Directed web searches via the Google search engine for coverage of virtual social network use in corporate and business environments, which converges with digital journal articles.

A taxonomy of virtual social networks was established by cross-referencing indexation of social networking sites from primary sources, information technology reviews online, and pre-existing taxonomies available from Wikipedia articles. The resulting classification and review are purely qualitative at this point. Beyond traffic and usage analyses there are no further quantitative methods and data to support analysis at this phase of the project. The majority of literature sources about virtual social networking concern other aspects of social network usage, such as case-based academic research on issues such as communications, socialization, and abusive usage relative to social internet media.

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2 Results

The people, interactions, and information that constitute a virtual social network are also collectively called a virtual community. The concept of virtual community can be a super-ordinal category of virtual social networks, because of the looser ties of other types of non network-centric communities, such as Web 2.0 interactions, massive multiplayer online role-playing games"(MMORPG), authoritative and closed wikis, blogs, etc. Therefore, the meaning that we adopt for the concept of virtual social network in this document extends to such broad virtual communities, but the focus is nevertheless on virtual social networking capabilities and services such as exemplified by Facebook and LinkedIn. The following taxonomy was created to firstly overview types and contexts of virtual social networking and secondly, to narrow down the type of desirable framework for the potential implementation of net-centric, interoperable tools for the Canadian Forces. The emphasis is centered on professional and military virtual social networks, which follow the broader types of social networking platforms.

2.1 A taxonomy of virtual social networks

2.1.1 Academic or applied research knowledge bases

This type of virtual community revolves around an endeavour to disseminate research data and ideas, as well as providing multiple external opinions on critical judgments such as prognostics and diagnostics, querying other experts at large on anything from simple and technical, to life-threatening issues. Medical virtual social networks such as biomed experts, MyMedwork, Research Crossroads, and Sermo, aim to provide health care professionals with support from their peers on critical judgments and decision-making processes. Other virtual communities focus on the social cataloguing of resources, such as Academia.edu and ResearchGATE, which have the potential to facilitate the communication and exchange of ideas between researchers, in the hope of increasing their efficacy and generating novel approaches and ideas. Yet another set of research knowledge bases are technology-specific, such as INmobile.org, aimed at wireless industry professionals who attempt to solve technological challenges and problems via virtual interactions, and News Reuters, a social network for employees whose companies are Reuters customers, or AdGabber.com, which caters to the advertisement professionals [13].

2.1.2 Commercial social networks

Commercial social networks are designed to support business transactions and to build a trust between an individual and a brand, by relying on user opinions about the product, querying ideas to make the product better and enabling customers to participate with the

brands in promoting development, service delivery, and a better customer experience. An example of this type of network is Dell IdeaStorm.

2.1.3 Friendship-based (generic) social networks

This is the type of virtual social network that most people are likely to be acquainted with. The most popular friendship-based virtual social networks in North America are Facebook and MySpace, with demographics in the millions of users. Other popular virtual social hubs are Bebo, Friendster, Hi5, Orkut and Plaxo. The pioneer website in this genre was SixDegrees.com, inspired by the popular quote to the effect that most people can be related to someone else through six degrees of separation.

Users on friendship-based virtual social networks can join sub-networks organized by city, workplace, school, and area. Once a user is registered, he or she can connect and interact with other people, starting with people whom they know more directly, and outward to friends of friends, etc. Such technologies have been found to be primarily used to reinforce existing relationships rather than forging new ones [14]. Much of the input on this type of social networking application is passive in nature as members are automatically fed news on information and actions performed on-site by other members. Some of the friendship-based virtual social networks are slowly gaining usage in the corporate sector, either by sheer numbers of users, or by encouraging workplace exchanges via collaborative online applications, such as Facebook and Plaxo.

2.1.4 Media-type based social networks

Flickr, YouTube, DeviantArt, Vimeo, etc. are all sites that encourage casual and serious individuals to contribute multimedia in a large community, where some people are providers while the overwhelming majority will satisfy itself with content appreciation and criticism. The proportions and traffic generated by sites like YouTube are undeniable, being covered in the media as pioneers of Web 2.0 technology.

2.1.5 Recommender systems

Some websites and accompanying search engines are geared towards recommending products and services, in a collaborative effort to quickly narrow in on information by interests, habits, etc. This exercise in semantic data mining creates shopping guides, social guides, social bookmarking and tagging, travel guides, and even “trust-based” and ranked systems such as Epinions.com.

2.1.6 Support-based networks

Many websites are simply interactive virtual social networks geared towards specific topics where socialization is encouraged or even solicited, such as communities of people suffering common ailments and illnesses, while some others engage in cooperative economics, support deliberative social networks, or are driven by ethics issues or religious advocacy. Non-profit organizations now have the means to reach out to many

orders of magnitude more people than with pre-internet and pre-Web 2.0 technologies, at very low costs, with this type of network.

2.1.7 Video games networks

By far the most frequented genre of virtual community, the video game community has time and again been qualified as the engine of the economy and innovation for information technology and electronics. Video gaming has evolved into online virtual societies and infrastructures, from “first-person shooter” (FPS) hubs for games such as Halo, Crysis, and Call of Duty, to “real-time strategy” (RTS) online gaming, such as in StarCraft, Age of Empires, and Command and Conquer, where gamers raise armies and engage in military strategy. But the most impressive virtual social networking in this category is achieved via “massive multiplayer online role-playing games”, or MMPORGs, and in recent years there has been a phenomenal rise in games such as EverQuest, Ultima, and World of Warcraft. World of Warcraft, by Blizzard Entertainment, for example, has a community of more than 11 million users, who are actively engaged in an immersive 3-D environment where they endeavour to achieve a mixture of individual or group-based challenges. It is no surprise that this cross between video game entertainment, a persistent virtual world, and the capability for encouraged socialization, has generated such popularity [15].

2.1.8 Virtual worlds

While so-called virtual worlds share many similarities with the aforementioned MMORPG games, they are generally labelled as such by virtue of being more generic in function than video game entertainment. Virtual worlds such as Active Worlds, DotSoul, Second Life, and the prototype web.live by Nortel, are socialization networks where users meet and congregate either by pure curiosity and a desire for socialization (such as the very popular Second Life), or, because some have been designed to enhance the networking capabilities of the workplace, in the case of web.alive. Second Life has been very successful in establishing a virtual economy linked to real-world finances by allowing users to create virtual goods and sell them, or, in other words, providing a virtual space for e-commerce. Second Life even offers the means for the non-lucrative distribution of information and services, for various institutional and academic purposes, and distance-learning education [16].

2.1.9 Professional social networking

Many virtual social networks have been designed with a focus on interactions and relationships concerning professional endeavours and business opportunities, beyond general social interactions. In this context virtual social networking is proving to be an efficient way for individuals to build professional connections without face-to-face meetings. Such networks allow professionals to find like-minded individuals by looking online through filters such as title, industry types, business interests, etc.. This type of professional network service enables members of the business community to build a huge network of connections based on title, industry, or business interests so that they can

discuss interests, stay informed and share knowledge and experiences. Such interactive meeting places therefore constitute enhanced business to business marketplaces. As with friendship-based applications, the push-based component of professional social networking brings information to the user passively. Members are informed this way about such aspects as, who other members have recently connected with, since connections made by a colleague might be of interest. Through the professional network database users are provided with the ability to locate sources of expertise and to connect quickly and easily with new, previously unfamiliar, contacts. Professional networking in this context is frequently used for researching sources of employment and scouting for potential employees. According to the Institute for Corporate Productivity [17] in 2007, up to 65% of business professionals were already using virtual social networks, the most popular being LinkedIn, Yahoo360, and MySpace. Usage was primarily in the following areas:

- 52% to keep internal staff and remote employees connected,
- 47% to connect with potential clients and to showcase their skills,
- and 35% to assist them in finding jobs.

There is already a plethora of professional virtual social networks, the most popular being Etheryl, Harris Connect, LinkedIn, Nethooks, Ryze, Spoke, tribe.net, XING, and Yahoo! Kickstart, but the potential for using generic virtual social networks such as Facebook and Plaxo is currently being investigated from all interested parties – the social networks themselves (for adoption, commercialization, and expansion purposes), some enterprises (in order to leverage new communications and productivity technologies to their benefit), and information technology journal reviews (reporting on novel social media technologies).

2.1.10 Do-it-yourself networks

Yet another interesting capability is the possibility to create or host an entirely customized virtual social network tending to very specific requirements or desires of existing or prospective communities and groups. Web-based services and businesses such as Elgg, Ning, IGLOO, Lotus Collaborative software (the last two of which provide customized services and features based on user needs, but are ultimately designed from the server side), and the aforementioned web.alive from Nortel, allow customers to choose what they want out of a virtual social network from a set of functions, layouts, services, and interoperability with third-party software and web-based applications.

A very interesting feature of customizable networks (which is nevertheless available in preset networks such as Xing and Second Life) is the possibility of creating a closed virtual social network, i.e. limit the network to memberships within the organization or group of interest, or allowing partial or total access to the external world. This might be desirable for communities wanting to avoid the threat of spam, spyware, undesirable members, as it provides increased security.

2.1.11 Military professional and social networks

2.1.11.1 Generic social networks

Some virtual social networks have proven to be quite successful in maintaining and strengthening the bonds between military personnel, and between personnel and families. “military.com” is such a network, with a membership of 10 million from the US armed forces and veterans. The network serves as an infrastructure to facilitate access to services and benefits bestowed to military personnel, families, and veterans. It also serves as a hub for prospective members, as well as keeping people informed on career and educational opportunities. Some other military social networks are based on more conventional and pre-established virtual social networks, such as the Indian Army, which has a virtual community on Orkut, the Google owned virtual social network. Support groups also have their own virtual social networks, such as SpouzeBUZZ, and the Family Readiness Group.

2.1.11.2 Simulations and virtual reality

Canadian and American military research concerned with Web 2.0 is growing and, a few virtual reality technology projects are already in development. Simulation technology, while not being geared towards identical objectives, is nevertheless of relevance in the discussion about online virtual communities and social networking. As an example of interest, the American military is developing a virtual world called Sentient Worldwide Simulation, which aims to mirror real-world events and places, a persistent world akin to MMPORG video games. Sentient Worldwide Simulation would be an attempt to simulate and follow major world events in real-time, and initially aims to be a training platform for professional development and military training exercises. With the help of a 3-D environment populated by avatars, some autonomous or semi-autonomous, critical scenarios such as catastrophes and mass casualties events could be modeled and provide critical insights in personnel development [18].

2.1.11.3 Social networking with information dissemination

Some virtual social networking endeavours were created by military personnel during deployments in order to cope with the needs for rapid information exchanges beyond the traditionally slow high security information databases such as SIPRNET and Intellipedia. Senior military personnel have been reluctant to authorize such ad hoc products initially, but it became clear that their effectiveness was invaluable for deployed assets. Networks like CAVNet and TiGRNet enable timely information exchange about enemy and peer activity, bypassing information analysts and heavy bureaucracy.

“Company Command” and “Platoonleader”, while being more generic virtual social networks, also pursue the aforementioned endeavour of disseminating and finding information on work experience, current activities, and cultural exchanges. Both subdomains are hosted by www.army.mil, the official website of the United States Army. Intellipedia, a secured access information dissemination system in the likeness of

Wikipedia, constitutes a unique online collaborative tool where data is shared within and between US intelligence agencies. Over 3,600 intelligence professionals tap into "Intellipedia" [19]. These sites are not open to the public [20].

2.1.11.4 AI-assisted social networking

iLink is a support system in the form of machine learning algorithms that models users' and social network content. The support system establishes behavioural patterns of inputs, queries, searches, with web content access, pages and fields viewed, etc., in order to generate suggestions for end-users in an adaptive way, much like some business endeavours at behavioural ad-targeting have done so for advertisement purposes, such as the Google AdSense[1] network. iLink aims to enhance the information dissemination capabilities of existing virtual social networks, and is being tested on the aforementioned Platoon Leader and Company Command networks, as well as the Family Readiness Group. By helping users to sort through immense quantities of content, machine learning software enhances the ergonomics of information and resources research [21].

2.2 Traffic analysis and link analysis

There are only a few tools currently available to objectively measure the impact and scope of web-based services such as virtual social networks. One of such methodologies is via the use of network analytics. Web analytics is *"the measurement, collection, analysis and reporting of internet data for purposes of understanding and optimizing web site usage."* [22] Traffic and link analyses allow us to have some objective data on the usage, popularity, and relevance of information disseminated on the internet, particularly at the website level as a unit of interest. The following internet-based network analytical tools provide some insights on how virtual social communities are evolving. All data was collected via the corresponding service websites, as well as with the help of the *SearchStatus* toolbar for the *Mozilla Firefox* browser, found at http://www.quirk.biz/searchstatus/.

2.2.1 Alexa

Alexa Internet, Inc. lists and ranks web usage based on various traffic data sources, chiefly via the data provided by *Alexa Toolbar* users. Traffic ranking is based on aggregated data for periods of three months of historical traffic data, through the combination of page views from the website, and reach (the hypothesized pool of users, or website demographics). These calculations are compiled daily, and averaged over time. Changes in ranking are based on a comparison between current and previous ranks. Sites are defined at the domain level, *e.g.* www.google.com and www.maps.google.com being on the same domain. Personal sites and blogs, etc. are exempt from this measure and treated separately when it is possible to differentiate them, whereas mirror sites (other URLs which duplicate content, such as alternate download sources for proprietary

[1] Visit http://en.wikipedia.org/wiki/AdSense for further references and a list of similar, competing services.

or open source software or documentation, e.g. Ubuntu Linux' download mirror sites) are counted towards the rank of their originator site.

Reach is defined as the percentage of site users from the overall pool of web traffic compiled by Alexa via its information sources. Reach is calculated over seven days and three months periods, averaged daily and over these periods of time, and updated in the same fashion as ranks. Page views are compiled per users and per day, with multiple views of the same content by the same user counting only once. Such numbers are averaged, compiled, and updated in a similar way to reach and page ranks. Data is normalized to account for geographic dispersion, and weight is given to statistical pool samples in order to account for other biases, such as to account for the population not using an *Alexa Toolbar*.

Change in reach is benchmarked in a list labelled *Movers & Shakers*, to visualize weekly changes in trends and dynamics in network traffic. Traffic data is biased by the overall pool of Alexa data providers, and may therefore differ to an unknown extent from the actual global web users population. Another bias is the liberal definition of site-level unit of data compilation, which is bound to be unable to account for domain-level identity discrepancies. To illustrate this idea: some web pages and services are hosted on identical domains, but may have very different traffic data between themselves. Unfortunately, pitching the traffic analysis data at the domain level obfuscates such finer-grained distinctions. Finally, sites with low-frequency visits and low-population usage are more likely to yield less accurate data, as statistical samples become less and less reliable. The Alexa website indicates that sites with less than 1,000 monthly visitors or traffic rankings above 100,000 are unlikely to yield accurate information.

From the results that are reported on table 1, as well as figures 1, 2, and 3 below, it is clear that social networks are already among the top for internet traffic. Indeed, besides search engines such as Yahoo and Google, multimedia hosting sites such as Flickr and Youtube, knowledge bases such as Wikipedia, and some highly popular commercial websites such as Amazon and Buy.com, virtual social networks rank very high for everyday use of the internet. Given the sheer magnitude of the quantity of websites and domains in activity on the internet, the selection of online social networks listed below is still impressive, down to the highly specialized virtual communities such as the American military websites at the bottom of our short list.

Table 1: Alexa network analysis information for selected virtual social networks. Information collected as of February 11th, 2009.

Virtual social network	Alexa global ranking (ordinal ranking of popularity measured by combining reach and pageviews)	Ranking in Canada	Ranking in the USA	Reach (% of overall collected network traffic data related to a given web domain)	Page views (# of unique pages viewed per user per day)	Incoming links from other websites
Facebook	5	3	5	13.43%	10.81	155,220
Myspace	7	15	3	5.518%	27.29	335,770
Hi5	17	(very high)	85	2.07%	29.73	10,215
Flickr	32	20	18	1.782%	8.79	236,171
Friendster	45	106	196	1.1038%	22.33	21,898
LinkedIn	148	129	43	0.4175%	9.23	43,875
Military.com	2,113	N/A	540	0.0454%	2.71	4,372
Company Command & Platoon Leader	2,909	7,063	827	0.0317%	3.3	22
Spousebuzz.com	518,430	208,707	455,084	0.00023%	1.2	165
Army Family Readiness Group	660,045	N/A	122,195	0.00016%	1.7	75

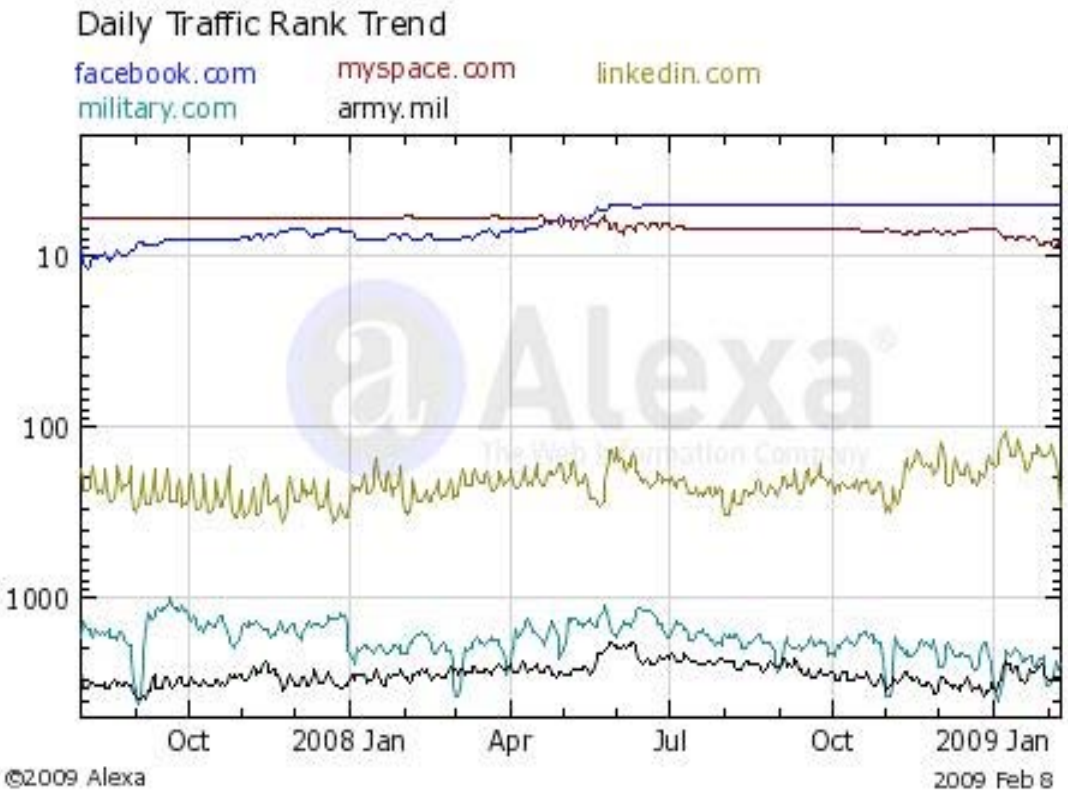

Figure 1: Alexa daily ranking for selected virtual social network websites. The x axis represents the time of data collection, and the y axis represents daily traffic rank for web domains, the higher on the axis being more popular.

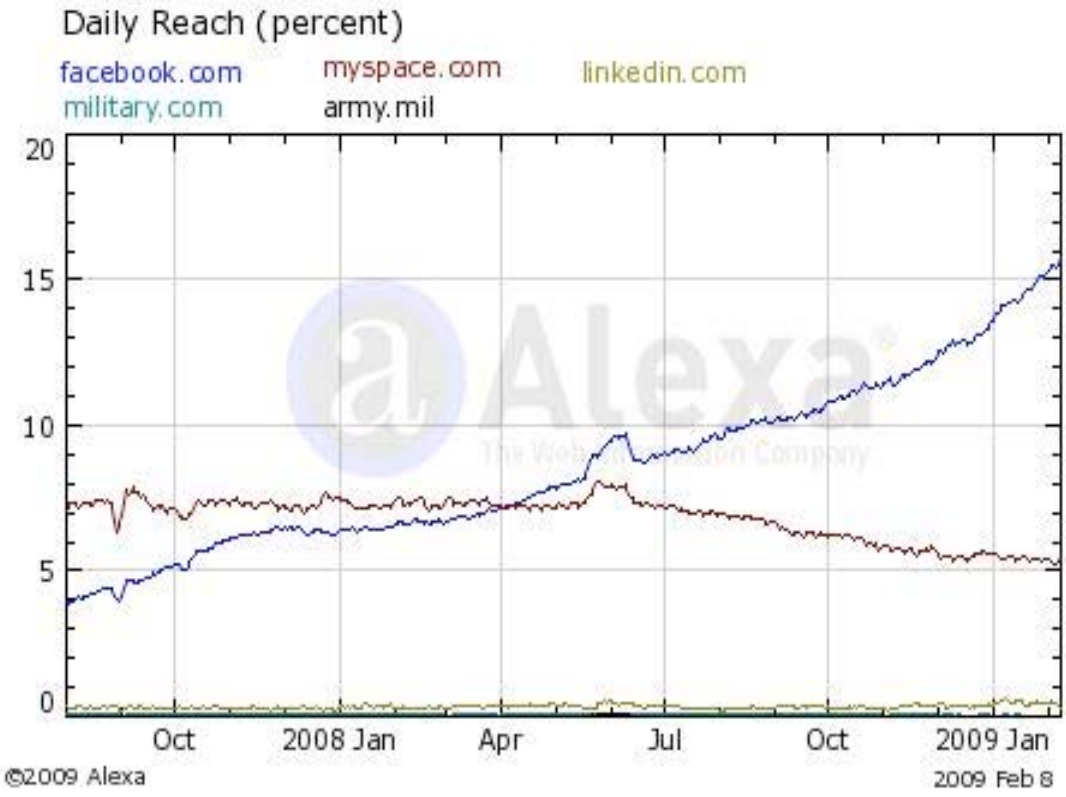

Figure 2: Alexa daily reach for selected virtual social network websites. The x axis represents the time of data collection, and the y axis represents daily reach (percentage of overall collected network traffic data related to a given web domain), the higher on the axis being more substantial.

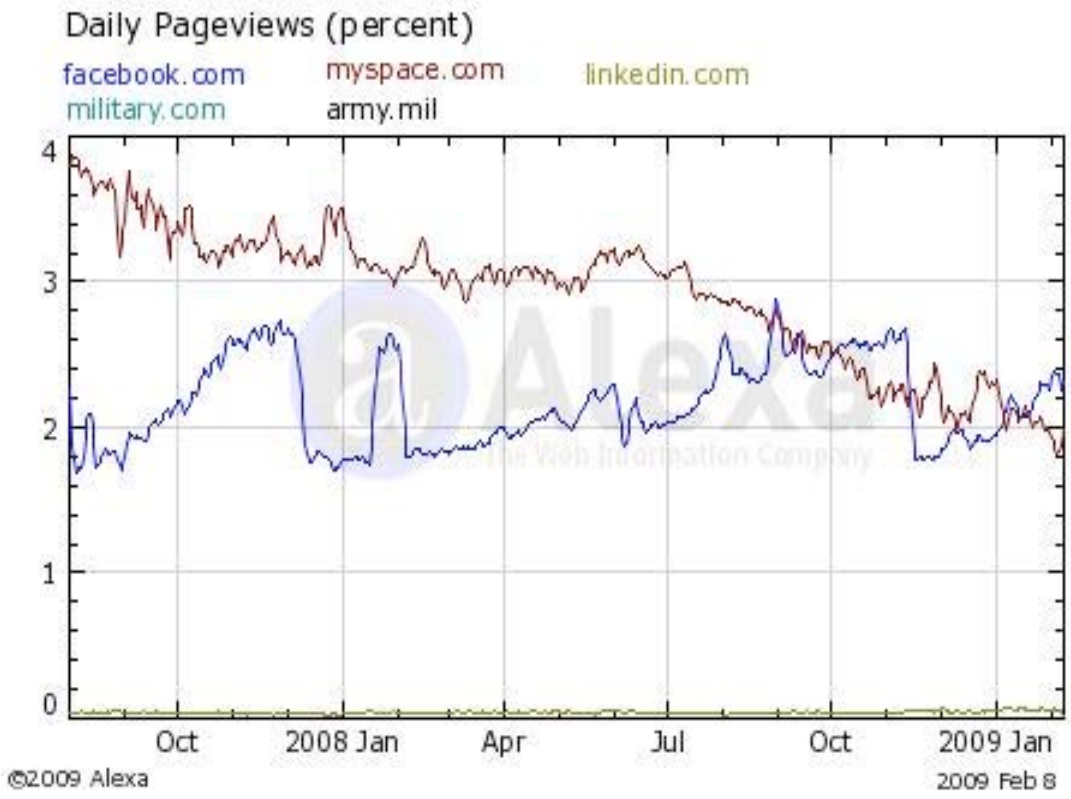

Figure 3: Alexa daily page views for selected virtual social network websites. The x axis represents the time of data collection, and the y axis represents daily page views (unique visitors page views on a daily basis, averaged over users), the higher on the axis meaning more frequented web pages.

2.2.2 Compete and Quantcast

Compete.com and *Quantcast.com* are other web traffic analysis services similar to Alexa, and have their recent rankings presented here for the sake of cross-referencing. Recent editorials (Q1 2009) on Cnet.com [23] and Site Check [24] show that the numbers are variable from one network traffic analysis service to another (see tables 2 and 3 below), but they are nevertheless similar. Joe Savelberg from Site Check affirms that Compete uses a USA based panel to estimate the pool of population, or reach, that frequents a given website, whereas Quantcast uses a direct, global and inference-based method to assess reach rankings. Compete does not offer global internet traffic information. Another interesting feature of Quancast is that it offers some information on business and corporation uses of some social networks, as exemplified in figure 4 below, for *LinkedIn.com*.

Table 2: Compete.com traffic information for the top 25 social networks (from USA only). Ranks are calculated on monthly averaged (normalized) datasets.

Compete.com (Ranked by Monthly Visits, Jan '09)					
Rank	Site	Unique Visits	Monthly Visits	Previous Rank	Quantcast Rank
1	facebook.com	68.557.534	1.191.373.339	2	2
2	myspace.com	58.555.800	810.153.536	1	1
3	twitter.com	5.979.052	54.218.731	22	14
4	flixster.com	7.645.423	53.389.974	16	24
5	linkedin.com	11.274.160	42.744.438	9	11
6	tagged.com	4.448.915	39.630.927	10	4
7	classmates.com	17.296.524	35.219.210	3	9
8	myyearbook.com	3.312.898	33.121.821	4	6
9	livejournal.com	4.720.720	25.221.354	6	7
10	imeem.com	9.047.491	22.993.608	13	25
11	reunion.com	13.704.990	20.278.100	11	13
12	ning.com	5.673.549	19.511.682	23	5
13	blackplanet.com	1.530.329	10.173.342	7	10
14	bebo.com	2.997.929	9.849.137	5	3
15	hi5.com	2.398.323	9.416.265	8	12
16	yuku.com	1.317.551	9.358.966	21	17
17	cafemom.com	1.647.336	8.586.261	19	22
18	friendster.com	1.568.439	7.279.050	14	8
19	xanga.com	1.831.376	7.009.577	20	19
20	360.yahoo.com	1.499.057	5.199.702	12	20
21	orkut.com	494.464	5.081.235	15	16
22	urbanchat.com	329.041	2.961.250	24	15
23	fubar.com	452.090	2.170.315	17	21
24	asiantown.net	81.245	1.118.245	25	18
25	tickle.com	96.155	109.492	18	23

For comparison: EasyScopes Entertainment Network: http://www.easyscopes.net

EasyScopes Network	238.337	635.272	(U.S.)
EasyScopes Network	1.154.395	2.110.061	(Global)

Table 3: Quancast.com traffic information for the top 25 social networks.

Quantcast.com (Ranked by Monthly U.S. Visits, last 30 days*)					
Rank	Site	Unique People	Visits per Month	Comments	Compete Rank
1	myspace.com	67.924.263	3.745.818.378		2
2	facebook.com	65.591.626	2.336.976.537		1
3	bebo.com	5.233.566	72.939.876		14
4	tagged.com	4.793.754	67.109.611	(1)	6
5	ning.com	6.223.445	50.756.466		12
6	myyearbook.com	3.343.610	50.169.499	(1)	8
7	livejournal.com	4.523.722	49.989.243		9
8	friendster.com	2.337.175	48.855.866		18
9	classmates.com	14.446.003	47.538.943		7
10	blackplanet.com	2.058.861	45.248.318		13
11	linkedin.com	10.400.482	45.188.353	(1)	5
12	hi5.com	3.806.922	34.124.281	(1)	15
13	reunion.com	12.651.804	23.298.039		11
14	twitter.com	4.102.444	21.951.763		3
15	urbanchat.com	545.134	21.559.868		22
16	orkut.com	480.840	21.089.945		21
17	yuku.com	1.581.668	14.202.664	(1)	16
18	asiantown.net	116.165	9.890.214		24
19	xanga.com	2.327.065	9.876.287	(1)	19
20	360.yahoo.com	1.143.267	9.301.764		20
21	fubar.com	631.960	6.596.210	(1)	23
22	cafemom.com	1.118.502	6.291.330	(1)	17
23	tickle.com	145.325	163.580		25
24	flixster.com	5.900.000		(2)	4
25	imeem.com	6.200.000		(2)	10

* Quantcast snapshot taken on February 10th, 2009 -- numbers for last 30 days

(1) Directly measured Quantcast Profile

(2) Directly measured nut protected QuantCast Profile -- real numbers not available

For comparison: EasyScopes Entertainment Network: http://www.easyscopes.net

EasyScopes Network	238.337	635.272	(U.S.)
EasyScopes Network	1.154.395	2.110.061	(Global)

Figure 4: Quancast.com business use information for LinkedIn.com

2.2.3 Google PageRank

Google PageRank is a popular tool for link analysis, used by Google Internet to assign weight values to elements in a hyperlinked set of web-based documents, intended to assess the relative importance of such elements relative to the set. Figure 5 below shows the relative importance attributed to elements, out of 100, in a simple network. Fewer links to and from elements do not necessarily make such elements less important, as the links themselves determine the importance of said elements. PageRank is a numerical value assigned by Google between 0 and 10 (a probability distribution on a logarithmic scale), for each website on the Internet. The PageRank of a particular web page is based on the quantity of inbound links[2] and the PageRank of the pages providing the links. Other factors such as the relevance of search words on the page, and unique visitor counts also shape the PageRank of a given web page. Table 4 below shows the PageRank ratings for our previous list of selected virtual social networks. Similar to the data gathered via the abovementioned traffic analyses, the relative importance of domains hosting virtual social networks are of significant, if not paramount importance in everyday internet searches and overall web usage.

[2] An inbound link is a link from another web site or overall domain which leads to the site or domain of interest.

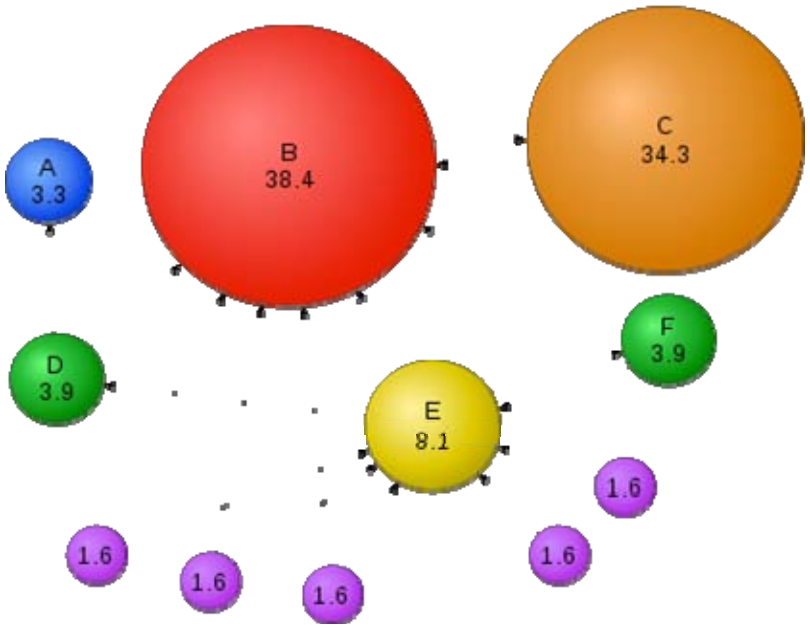

Figure 5: PageRank values for a hypothetical, simple network, out of a 100 (before they are rescaled logarithmically by Google out of 10).

Table 4: Google PageRank ratings out of 10 (on a logarithmic scale) to measure websites' relative importance to the Google search engine.

Virtual social network	**Google PageRank**	**Virtual social network**	**Google PageRank**
Facebook	9	LinkedIn	8
Myspace	8	Military.com	8
Hi5	7	Company Command & Platoon Leader	8
Flickr	9	Spousebuzz.com	6
Friendster	7	Army Family Readiness Group	6

2.3 Future prospective research tools

Some highly desirable information on virtual social networks use, effectiveness, and appreciation cannot be acquired at the current phase of this research program, chiefly because Canadian Forces' use of, and feedback on virtual social networks has not been investigated yet. The following measurement tools and methodologies may provide such insights in future research on the impact of virtual social networks once a community has been established and some observational data can be gathered (e.g., once a web domain has been established, even a prototype, via which a target population of test users communicate and exchange or seek information, some site-specific web analytics-derived data would yield additional insights, in comparison with the coarse—grained demographics and network usage information from the previous section).

2.3.1 Objective measures

2.3.1.1 Google Analytics

Google Analytics is a free service that generates detailed statistics about visitors and traffic for a specific website. The data provided via Google Analytics is geared towards social media marketing, but it can be co-opted as a research tool to acquire observational data much in the same way as the traffic and link analysis services described above. Google Analytics allows analysts to *"track visitors from all referrers, including search engines, display advertising, pay-per-click networks, email marketing and digital collateral such as links within PDF documents"* [25]. Google Analytics can provide data such as:

- advanced segmentation: to analyze subsets of traffic on web pages and compare segment performance;
- motion charts: a tool to generate analytical reports with multiple variables, exploiting data visualization technologies in order to observe complex relationships over time;
- custom reports: drag-and-drop reporting system for information presentation on traffic analysis;
- rapid implementation: Google Analytics can be embedded directly into a website of interest to enable straightforward traffic analysis, presented via simple and elegant dashboards;
- social media marketing results through the analysis of keywords and campaign with comparison tools; and,
- benchmarking metrics tools, trends and timeline visualization tools, loyalty and latency metrics, funnel information (lost traffic) visualization, geo-tagging, etc.

2.3.1.2 Social network analysis

The social network analysis approach applies network theory to frame information about social systems, focusing on the structure of ties between individuals and groups. The power of social network analysis stems from its difference from traditional social scientific studies, which assume that it is the attributes of individual actors that matter. Social network analysis produces an alternate view, where the attributes of individuals are less important than their relationships, and ties with other actors within the network. No assumptions are made about behaviours and norms, instead the analysis is strictly pitched at the shape of social networks, and how the shape and extent of the network contribute to individuals and groups. This approach has turned out to be useful for explaining many real-world phenomena, but leaves less room for the ability for individuals to influence their success, because so much of it rests within the structure of their network.

Social network analysis has been used to examine how organizations interact with each other, characterizing the many informal connections that link executives together, as well as associations and connections between individual employees at different organizations. For example, power within organizations often comes more from the degree to which an individual within a network is at the center of many relationships than actual job title. Social networks also play a key role in hiring, in business success, and in job performance. Networks provide ways for companies to gather information, deter competition, and collude in setting prices or policies.

A list of candidate social network analysis tools to investigate a prototype virtual social network community can be found at
http://en.wikipedia.org/wiki/Social_network_analysis_software.

2.3.2 Subjective measures

Whether such online social networks, implemented for the specific purposes of the Canadian Forces members would be an appealing and useful viable option cannot be anticipated. Traditional means of empirical validation will be required once a reasonable sample of the population has adopted the use of a social network platform, whether such a network is a pre-established virtual community or a tailored, prototypical service.

Subjective measurement tools such as Likert-scale surveys [26] may be desirable to measure the individual and overall impacts of virtual social network use, beyond the aggregated network usage data from traffic analysis. Annexes A.1 to A.3, attached below, present three prototype Likert scale questionnaires that may be used to measure subjective and qualitative impacts on virtual social network users. These surveys are generic enough that they should apply to most existing or prototypical virtual social networks, and precise enough that they may yield non-trivial information on what is regarded as beneficial or lacking from a virtual social community service. The three surveys concern aesthetics, ease of use, and overall satisfaction and usefulness.

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3 Discussion

Based on the results from this investigation it is clear that virtual social networking has been adopted and successfully implemented in various forms by numerous user groups within the social and business worlds. The explicit design of applications varies, being focussed on addressing the objectives and needs of specific user communities, and although use of social networking is already widespread, the platform continues to develop and become more sophisticated and refined. There is no doubt that this kind of web-based networking tool has enjoyed unequivocal success to date, no matter what the context, and progress in the field has occurred at a remarkable rate and continues to do so. Although some virtual applications, such as Second Life and iLink, are being used in the military domain, to our knowledge virtual social networking itself has not been officially implemented in the Canadian Forces.

Some users in the business community have made the transition from using a successful and familiar communication tool for personal use, to adapting it to the working environment. Individuals who have made this connection are making a point - that their work domain is lacking in tools required to perform necessary duties; tools that are readily available and consistently used in recreational worlds. However, there are serious considerations associated with this self-adaptive approach, especially in domains that are alert to issues revolving around security and time sensitive responsiveness. The military domain is a prime example of such a domain where the dissemination of information must be carefully observed and where means of streamlining decision making and responding must be optimal. As such, appropriate research into the requirements of this specialized domain must be conducted to ensure that the most beneficial and useful application of virtual social networking makes its way into the operator's toolbox.

Based on the above taxonomy, of most interest to future work under the DRDC project are the forms of virtual social networking that model on the basis of friend or professional network building (e.g., Facebook and LinkedIn). As discussed previously, one of the unique components of applications like these is the passive nature by which information is received by network members. This particular aspect and the connectivity formed through establishing networks could well serve the sharing of information in the distributed netcentric domain in which military operations are typically conducted. In this dynamic environment the CF are often working with joint and coalition partners and other government and non-government organizations. Units, component members, and individual personnel can change quickly and frequently, and being able to keep up to date with positional changes and activities, and having access to identity information attached to incoming players experience, for example, has been identified as a challenge that a social networking tool could help ameliorate [27]. Similarly, the social network application could augment the integration of new personnel by providing them with information passed on by their predecessor, as well as provide various levels of information on the operation and on other team members.

A significant problem in an ever-changing multi-player environment is the ability to find sources of expertise quickly, and the social networking tool could be used as a mechanism to quickly and efficiently access information related to who knows what, and where expertise resides.

The demonstrated success of social networking in building relationships in so many different environments points to a potential mechanism that could be pivotal in the development of relationships between coalition and other organizations participating collaboratively in operations. Trust is an essential component to establishing good working relationships in any context, but in the military domain, where the stakes are high for component members, it is of particular importance. However, in environments where component members are not familiar with each other, building trust is difficult, if not impossible. The effectiveness and durability of virtual teamwork depends largely on commitment and personal trust, which is not only exceptionally difficult to build in long-distance relationships but, even if established, is likely to gradually dissipate over time when teams are not collocated and have no face to face contact [27]. A social networking application could serve to promote the building of trust between unfamiliar mutli-national partners. In a related context it has been identified that a military social networking tool could be extended to include other non-government organizations which would increase the potential for collaboration [27], and would also provide a means of sharing information between parties that might otherwise have difficulty collaborating and communicating due to public perception.

The intention of this paper is to share the findings to date with respect to our investigation of existing virtual collaborative tools. It is recognized that the development and implementation of a virtual social networking application into the military domain will be accompanied by an inventory of complications, limitations, and unique difficulties associated with working within that domain. For example, any Canadian Forces social network would have to be supported by a robust security framework to ensure that the sharing of sensitive information is controlled. It is not the intention of this paper to make light of these issues and it is hoped that future work will lend itself to identifying more specifically what the primary areas of concern are, and perhaps supply recommendations of ways to address them.

The results from the work presented here will be used as the first step of our investigation of requirements for implementing virtual social networking in the Canadian Forces. Future work includes, conducting a requirements analysis in the maritime domain, setting up a test user community to explore the use of a web-based collaborative tool set that includes social networking, and conducting empirical investigations to examine some of the issues in human performance associated with using social networking as a means of sharing information, identifying sources of expertise, and building trust between distributed teams in the military netcentric domain.

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Annex A Subjective Measurement Tools - Surveys

A.1 Aesthetics Questionnaire

Name: _____ Job Title: _____

Please rate your level of agreement with the statement that the social networking component is appealing to use. If a feature is not available or you have never used it, please check "*Not Used*".

	Appealing?					
The following social network components were appealing:	**Strongly Disagree**	**Disagree**	**Border**	**Agree**	**Strongly Agree**	**Not Used**
1. Initial (default) website layout and presentation	❑	❑	❑	❑	❑	❑
2. Tabs and embedded features layout	❑	❑	❑	❑	❑	❑
3. Private messaging window and options	❑	❑	❑	❑	❑	❑
4. Instant messaging window and options	❑	❑	❑	❑	❑	❑
5. Customizability options (related to the appearance of your personal page)	❑	❑	❑	❑	❑	❑
6. Pop-ups, mouse-over content, 3-D effects	❑	❑	❑	❑	❑	❑
7. Third-party applications integration in the website	❑	❑	❑	❑	❑	❑
8. The choice of colors, fonts, text size, and text field areas	❑	❑	❑	❑	❑	❑
9. Layout is well-organized and the aesthetics support its functionalities	❑	❑	❑	❑	❑	❑
10. Overall social networking aesthetics	❑	❑	❑	❑	❑	❑

A.2 Ease of Use Questionnaire

Name: _____ Job Title: _____

Please rate your level of agreement with the statement that the social networking component is easy to use. If a feature is not available or you have never used it, please check "*Not Used*".

	Useful?					
The following social network components were useful:	**Strongly Disagree**	**Disagree**	**Border**	**Agree**	**Strongly Agree**	**Not Used**
1. Instructions for initial profile setup	❑	❑	❑	❑	❑	❑
2. Functions to add contacts	❑	❑	❑	❑	❑	❑
3. Private messaging features	❑	❑	❑	❑	❑	❑
4. Instant messaging features	❑	❑	❑	❑	❑	❑
5. Options to add user content (i.e. customize your profile)	❑	❑	❑	❑	❑	❑
6. Privacy settings	❑	❑	❑	❑	❑	❑
7. Third-party applications (e.g. widgets, multimedia enhancements, etc.)	❑	❑	❑	❑	❑	❑
8. Options to search network content (contacts, groups, topics, etc.)	❑	❑	❑	❑	❑	❑
9. Integration with other software (bookmarking,email notifications,mobile devices, etc)	❑	❑	❑	❑	❑	❑
10. Overall social networking experience	❑	❑	❑	❑	❑	❑

A.3 Overall Satisfaction and Usefulness Questionnaire

Name: _____ Job Title: _____

Please rate your level of agreement with the following statements regarding specific features or aspects of the social networking experience, with regards to satisfaction and usefulness. The statements begin with more specific features and end on more general aspects of virtual social networking. If a statement concerns a feature or aspect that is not available, irrelevant, or you have never used it or been exposed to it, please check "*Not Used/Not Relevant*".

	Satisfied?					
The following social network components proved to be satisfying:	**Strongly Disagree**	**Disagree**	**Border**	**Agree**	**Strongly Agree**	**Not Used / Not Relevant**
1.Instructions for initial profile setup	❑	❑	❑	❑	❑	❑
2. Private messaging features	❑	❑	❑	❑	❑	❑
3. Instant messaging features	❑	❑	❑	❑	❑	❑
4. Options to add user content (i.e. customize your profile)	❑	❑	❑	❑	❑	❑
5. Functions to connect with contacts (messages, search features, status updates)	❑	❑	❑	❑	❑	❑
6. Third-party applications (e.g. widgets, multimedia enhancements, etc.)	❑	❑	❑	❑	❑	❑
7. Options to search network content (contacts, groups, topics, etc.)	❑	❑	❑	❑	❑	❑
8. Integration with other software (bookmarking,email notifications,mobile devices, etc)	❑	❑	❑	❑	❑	❑
9. Privacy settings	❑	❑	❑	❑	❑	❑
10. Help features, support tools	❑	❑	❑	❑	❑	❑
11. Stability and reliability of features and options while online	❑	❑	❑	❑	❑	❑
12. The virtual social network's security measures and policies	❑	❑	❑	❑	❑	❑
13. The communications via, and uses of this social network were manageable	❑	❑	❑	❑	❑	❑
14. The social networking experience was well-integrated with your workplace tasks	❑	❑	❑	❑	❑	❑

	Satisfied?					
The following social network components proved to be satisfying:	**Strongly Disagree**	**Disagree**	**Border**	**Agree**	**Strongly Agree**	**Not Used / Not Relevant**
15. Social networking enhanced or facilitated your workplace communications	❑	❑	❑	❑	❑	❑
16. This social network exceeded your expectations relative to other social networks	❑	❑	❑	❑	❑	❑
17. Overall social networking experience satisfaction	❑	❑	❑	❑	❑	❑

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(U) In joint, coalition, and multi−agency operations, where component members are physically dispersed and culturally and operationally diverse, it is not uncommon to find that members are not familiar with the roles, expertise, and expectations of partnering units or organizations. Developing shared awareness and a high degree of interoperability in this distributed, anonymous environment necessitates appropriate tools to assist teams in collaboration and information sharing, and in localizing resources and expertise. In the corporate and public worlds a relatively new class of communication called virtual social networking (e.g., Facebook, LinkedIn) is quickly taking over more traditional information sharing methods, such as email and chat. Virtual social networking represents evolutionary progress in disseminating information via the internet and its dynamic basis provides a rich forum for sharing information, for uncovering sources of expertise, and for developing extensive virtual connections between individuals and between groups. A research program has been initiated at Defence Research and Development Canada to investigate the requirements and feasibility of implementing this kind of web−based social networking with the Canadian Forces. This paper describes results from the first phase of the project, wherein social networking applications currently used by public and private organizations were explored with respect to composition, content, and use..

(U) Dans des opérations conjointes, en coalition, ou à multiple agences en partenariat, où les membres sont physiquement dispersés et culturellement et opérationnellement dissemblables, il est commun de retrouver des membres n'ayant que peu ou aucune familiarité avec les rôles, expertises et attentes des organisations et unités avec lesquelles ils ou elles sont partenaires. Afin de développer une conscience partagée et un haut degré d'interopérabilité dans cet environnement d'information distribuée et anonyme, il est nécessaire d'utiliser les outils appropriés pour assister les groupes vis−à−vis du partage d'information, et d'accroitre leur capacité à localiser les ressources et expertises appropriées. Dans les domaines corporatifs et publics, une nouvelle approche de communication nommée le réseautage social virtuel (e.g. Facebook, LinkedIn) gagne de plus en plus en popularité, aux dépends des formes plus traditionnelles telles que les courriels et le clavardage. Le réseautage social virtuel représente une évolution dans la dissémination d'information via l'internet, et ses fondations dynamiques permettent un échange d'information dans un espace commun riche en possibilités, dont la recherche de sources d'expertises, ainsi que la possibilité de développer aisément des contacts virtuels entre individus et groupes. Un programme de recherche a été initié afin d'explorer les prérequis et la faisabilité de l'implémentation d'un réseau social virtuel en ligne au sein des Forces Canadiennes. Ce document présente les résultats de la première phase de ce projet, où sont détaillées les applications actuelles du réseautage social virtuel au sein d'organisations publiques et privées, quant à leur utilisation, les conclusion

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