

The Changing Role of the Network Administrator

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CONTENTS

Introduction	1
Research Methodology	1
The Traditional Role of the Network Administrator	2
The Focus of the Job has Become More than Networking	2
The Importance of Availability	2
Impact on Network Administrators	3
The Changing Business Environment	3
Managing Cost is Important, but not Paramount	3
The Importance of Providing Security and Ensuring Application Delivery	3
Impact on Network Administrators	4
Demonstrating the Value of Network Management	4
What Senior Managers Care About	4
General Business Mandate: Streamline Business Processes	4
Industry Specific Challenges	5
Impact on Network Administrators	5
The Changing IT Infrastructure	6
Wireless LANs (WLANs)	6
Quality of Service (QoS)	6
Branch Office Optimization Solutions	6
Security	6
Impact on Network Administrators	7
Call to Action: What Does it Take to be a Successful Network Administrator?	7
Quotes from The ILEC Engineer	9
Quotes from The City Administrator	9
Quotes from The Processing Administrator	9
Appendix	10
Jim Metzler	10
Kubernan™	10
About Ipswitch, Inc.	10

THE CHANGING ROLE OF THE NETWORK ADMINISTRATOR

Introduction

The network administrator is often viewed as the Rodney Dangerfield¹ of IT. In other words, it is somewhat common for network administrators to not get the respect they deserve. In fact, in most organizations the network administrator has historically only been noticed when the network is down and people cannot access the applications they need to do their jobs.

That situation is changing. In particular, up until a few years ago the general feeling amongst the majority of senior business managers was that the network was both a commodity and a utility and needed to be managed as such. Because of this, the people who managed and administered the network were also beginning to be regarded as a commodity. Over the last few years, however, there has been a growing awareness that the network is central to the success of the organization. At the same time, the role of the network administrator has begun to change.

The goal of this white paper is to describe how the role of the network administrator is changing and to identify a set of attributes network administrators will need to be successful going forward. This white paper will identify what it will take for network administrators to shake off the image of being the Rodney Dangerfield of IT.

With that goal in mind, some sections of this white paper will describe how business objectives are changing and will demonstrate the linkage between network management and the organization's ability to achieve their objectives. Other sections of this white paper will describe some of the ways the network infrastructure has changed to accommodate evolving business requirements and will discuss how those changes are impacting the role of the network administrator. Each section will conclude with some observations about the content and what the section means to the changing role of the network administrator.

Research Methodology

To gain insight into the changes that are impacting the role of the network administrator, interviews were conducted with three network professionals. Table 1 contains a list of the people who were interviewed along with the phrases that refer to them going forward.

Job Title	Industry	Reference Phrase
Network Administrator	City Government	The City Administrator
Network Engineer	Independent Local Exchange Carrier (ILEC)	The ILEC Engineer
Network Administrator	Credit Card Processing	The Processing Administrator

Table 1: The Interviewees

In addition, over the last year Kubernan² has conducted multiple surveys that explored the changing IT environment. Throughout this white paper, the results of those surveys will be referred to as The Kubernan Market Research.

¹ Rodney Dangerfield was an American comedian who built his comedy routines around the fact that he did not get any respect

² As detailed in the appendix, Kubernan is a consulting and analyst joint venture of Jim Metzler and Steven Taylor

The Traditional Role of the Network Administrator

The Focus of the Job has Become More than Networking

As part of his/her traditional role, the network administrator focused almost exclusively on the organization's network. According to the Processing Administrator, when he started out as a network administrator, he focused entirely on network issues. He added that network issues currently take around 25% of his time and the rest of his time is spent on issues involving applications or security.

The ILEC Engineer stated that in the late 80s and early 90s there was no guaranteed network availability in large part because the network often broke down. He added that virtually all his focus at that time was on the physical plant and that he spent a large part of his time running around fixing cabling problems. He pointed out, however, that the network currently runs well and hence consumes much less of his time.

The City Administrator pointed out that when he started work as a network administrator in 1990 a major part of the role was to provide basic connectivity and the monitoring of that connectivity. As a result, he often walked around with a cable card in one pocket and a floppy disk in the other. At that time, much of his job was to pull coaxial cable to enable tasks that we now take for granted. For example, he pointed out that in 1990 merely allowing a computer to access a server to create a document that was then spooled to a printer was considered "really cool."

The Importance of Availability

A major component of the traditional role of a network administrator was to ensure the uptime of the network. In particular, their role was to eliminate network outages as much as possible, and to minimize the amount of time that it took to restore the network if there was an outage. This narrow focus on the role of the network administrator was driven in part by the overall business environment. In particular, shortly after the terrorist attacks of September 11, 2001 (9/11) companies began placing tremendous focus on cost containment. Around the same time, the dot com boom collapsed and companies began to seriously question the business value of IT. One of the industry leaders who encouraged this line of thinking was Nicholas Carr. In both an article in the Harvard Business Review³ as well as a subsequent book, Nicolas Carr stated, "IT has become a commodity. Affordable and accessible to everyone, it no longer offers strategic value to anyone."

As a result of the dot com implosion and the subsequent focus on the reduced value of IT, the majority of senior business managers began to regard IT in general, and the network in particular, as a utility. Part of the perception that the network is a utility means that senior business managers expect little more from the network than that it exhibit features such as high availability. Another part of the perception that the network is nothing more than a utility is that senior business managers do not believe that the network provides identifiable business value.

The Processing Administrator stated that senior management expects that the network will work all of the time. He added that these managers would not accept outages of any kind – network, application or security. The ILEC Engineer pointed out that the old days in which people would accept an occasional data outage are gone. His company, for example, provides video services to consumers, and it is imperative that these services are always available. The City Administrator said that providing high availability was "a major expectation." It is his belief that because so many people have networks in their homes, they expect even greater reliability from their work environment. He commented that if there is a network outage "you can hang your hat on the fact that there will be a house of fire" in terms of the effort put into resolving the outage.

³ "IT Doesn't Matter", Nicholas G. Carr, Harvard Business Review, May 2003

Impact on Network Administrators

In order to provide the level of reliability that management has come to expect, network administrators need to continue to exhibit some of the same attributes that they have always exhibited (e.g., tenacity, attention to detail and responsiveness). Network administrators, however, also need to be adaptable enough to change as the job evolves. This includes having the desire and ability to learn new technologies. In addition, because the job now requires ensuring the availability of applications, a level of software fluency is also a requirement.

The Changing Business Environment

Managing Cost is Important, but not Paramount

As part of The Kubernan Market Research, IT professionals were asked to indicate their enterprise's two most important business goals. The top three responses, and the percentage of times that they were referenced are contained in Table 2.

Business Goal	% of Respondents
Improve the Customer's Experience	37%
Reduce Cost	26%

One of the conclusions that can be drawn from Table 2 is that unlike the situation immediately following 9/11, reducing cost is no longer the top business goal. By a wide margin, the top business goal is improving the customer's experience. Another conclusion that can be drawn from Table 2 is that streamlining business processes is almost as important as reducing cost.

The Processing Administrator said that right after the dot com implosion reducing cost was his company's number one goal. He added that reducing cost is still important, but not as important as improving customer service. He also pointed out that his company has a few large customers that regularly change the processes that his company has to use in order to interface with them; this creates an environment that is in "constant flux" and which puts pressure on him to quickly respond to these changes.

Both The City Administrator and The ILEC Engineer agreed that reducing cost was not their company's top priority. The City Administrator works for a wastewater control facility. He noted that their top business priority is the efficiency of the workforce in general and their ability to respond to a crisis in particular. The ILEC Engineer pointed out that his company has been migrating away from their legacy business model of being a wireline provider of basic phone service to a business model that features new technologies such as Wi-MAX and new services such as video. As a result, his company is more focused on successfully making this transition than they are on minimizing cost.

The Importance of Providing Security and Ensuring Application Delivery

The movement away from having cost containment as the primary business goal has begun to impact and influence the IT organization. For example, there have been numerous articles in the industry press about the fact that companies are beginning to increase their IT budgets⁴. In addition, as part of The Kubernan Market Research hundreds of IT professionals were asked to indicate the relative priority that their organization placed on three tasks:

1. Improving security and disaster recovery (DR)
2. Ensuring acceptable application performance
3. Controlling cost

The answers given by those IT professionals were that the priority of the tasks was the same as the preceding list, with improving security and DR the most important task, and controlling cost the least important of the three tasks. That does

⁴ "IT budgets, salaries going up in 2007," Carolyn Duffy Marsan, Network World, September 18, 2006

not mean that controlling cost is not important; it is. What it means is that similar to the situation with senior business managers, controlling cost is still an important priority to senior IT managers. It is, however, not typically the highest priority.

The ILEC Engineer stated that minimizing IT costs is not that important to his organization and that they have recently spent millions of dollars to upgrade their infrastructure to be able to support their new business model. The Processing Administrator stated that the goals of the IT organization that he works for are similar to the company's goals and that reducing cost is not as important as improving customer service. He stated that their primary goal is to "get the job done right the first time."

Impact on Network Administrators

The changing business environment and the role that IT plays to support that changing environment means that successful network administrators must understand the company's business. Successful network administrators must also have enough business acumen to understand the role of IT and be able to explain the role of IT to senior managers in ways that make sense to them.

Demonstrating the Value of Network Management

What Senior Managers Care About

One of the reasons why network administrators are often viewed as the Rodney Dangerfield of IT is that it is difficult to find a senior business manager who really appreciates the value of network management. In virtually all cases, this situation does not change. In particular, bringing these managers to the point where they truly appreciate the intrinsic value of network management is not possible.

Since it will not be possible to get senior business managers to appreciate the intrinsic value of network management, network administrators must demonstrate its importance to what these managers care about. There are two classes of issues that senior business managers care about. One class is generic issues – issues that apply to most, if not all, organizations. Examples include improving the customer's experience, streamlining business processes and complying with government and industry regulations. The second class of issues is industry specific – each industry segment has issues that are specific to that industry and which are at the top of industry senior business managers' minds.

While senior business managers do not truly appreciate network management, they do understand that the day-to-day functioning of their business units relies heavily on the network. Because of that reliance, if the network is not performing well their organization is not performing well. Network administrators have the opportunity to leverage this growing dependency that the business has on the network to demonstrate the business value of network management.

General Business Mandate: Streamline Business Processes

The reason that streamlining business processes is so important to enterprises is because enterprises of all types are under constant competitive pressure to become increasingly agile, and one of the ways that they are becoming more agile is by streamlining their business processes. In order to quantify the extent of business process re-engineering, Kubernan recently asked over 300 IT professionals to indicate if their company was currently re-engineering any business processes, and if so, how many processes were being re-engineered. Their answers are included in Figure 1.

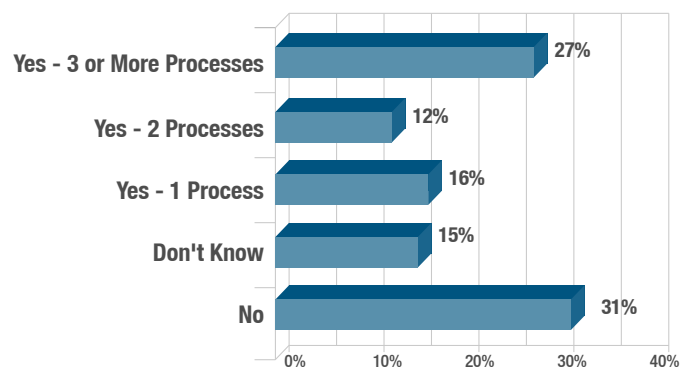
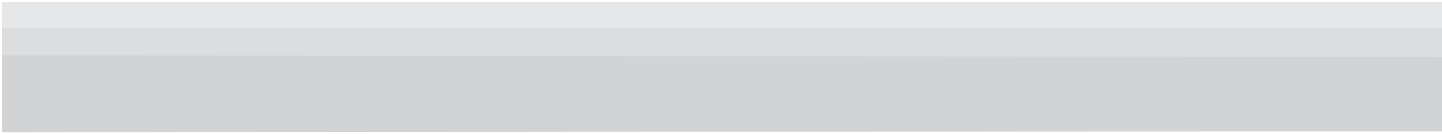


Figure 1: Extent of Business Processes Re-Engineering



It is interesting to observe that over half of the companies surveyed are currently in the process of re-engineering one or more of their business processes. It is even more interesting to realize that roughly half of the companies that are going through process re-engineering are currently re-engineering three or more processes. These companies are in the same constant flux that the Processing Administrator discussed earlier.

The process of streamlining business processes typically involves deploying new applications and the supporting IT infrastructure – all of which needs to be managed. A good example of this is that many companies are moving to a Web services-based approach to application development as a means of supporting more agile business processes. In this context, the phrase ‘Web services’ should be thought of as referring to reusable software modules. While a Web services-based approach to application development will enable faster and more economical software development, it will present some very significant management challenges. In particular, the Web services that comprise a given application will typically reside in several different data centers. As a result, the challenge of managing the performance of Web services-based applications will be significantly more difficult than the challenge of managing the current generation of n-tier applications. This situation presents an opportunity for network administrators. In particular, business managers will not get the results that they want – more agile business processes – unless network administrators can solve the thorny problem of how to manage and secure Web services-based applications. One way that network administrators can shake off the Rodney Dangerfield image is by making the rest of the organization aware of the importance of the role that they play in managing and securing these Web services-based applications.

Industry Specific Challenges

An example of an industry with very unique challenges is the healthcare industry. In particular, one of the primary components of the healthcare industry is the healthcare providers; these are the people and organizations that administer care. The key issues facing healthcare providers include the need to:

- improve the quality of care
- respond to ongoing labor shortages
- control the cost of healthcare
- increase operating efficiencies and effectiveness
- conform to the Health Insurance Portability and Accountability Act (HIPAA)

One of the ways that many healthcare providers have responded to these challenges is by providing health care practitioners with immediate and uninterrupted access to clinical information systems. These systems support the management of healthcare outcomes such as drug interaction checking, order entry, the electronic capture of a patient's vital signs, as well as clinical notes made by health care practitioners. These clinical information systems, however, typically require the deployment of a wireless LAN infrastructure which, similar to the situation with Web services-based applications, creates management and security challenges that will be described in the following section. This presents network administrators with the opportunity to make the rest of the organization aware of the importance of their role in helping them to achieve their business goals.

Impact on Network Administrators

In order to relate the value of network management to what senior business managers care about, network administrators must be able to recognize that the role of IT is to support the business and not to deploy IT for IT's sake. They must have an understanding of the company's business and have enough business acumen to establish the connection between network management and the company's business objectives.

The Changing IT Infrastructure

The previous section of the white paper focused on demonstrating the value of network management by directly linking network management with the organization's business objectives. This section will focus on demonstrating the value of network management by directly linking network management with the value added functionality that is being deployed in most enterprise networks in order to support evolving business requirements. In order for organizations to fully realize the value of this new functionality, network administrators have to be able to solve some very difficult problems.

Wireless LANs (WLANs)

WLANs are a critical component of a solution that enables healthcare practitioners to gain immediate access to clinical information systems. This is just one example of how organizations have deployed WLANs to enable their employees to be more productive. There are, however, a series of management and security challenges associated with WLANs. For example, it is important to be able to recognize rogue access points and remove them from the network. Ensuring that the WLAN is performing well is always important, but it is especially important if the organization is running voice over their WLANs. It is also important to ensure the security of the WLAN. This means keeping unauthorized users from being able to use the company's WLAN. It also means ensuring that nobody can access the traffic on the WLAN without authorization.

Quality of Service (QoS)

QoS refers to the ability of the network to implement policies that ensure that preferential treatment is given to certain classes of traffic. QoS is required in those situations in which bandwidth is limited and there are one or more delay sensitive, business critical applications. Preferential treatment could mean limiting the bandwidth that certain applications (e.g., email or Internet Radio) receive while simultaneously ensuring fairness for all the users of delay-sensitive applications such as VoIP (Voice over IP) or SAP.

One of the management issues associated with QoS involves identifying the applications that are running on the network and mapping those applications to the appropriate service class. Some organizations also set performance targets for certain key applications such as video. As a result, the network administrator has to perform ongoing monitoring and management to ensure that these applications meet their performance targets.

Branch Office Optimization Solutions

The goal of Branch Office Optimization Solutions is to improve the performance of applications delivered from the data center to the branch office over a variety of Wide Area Network (WAN) services such as Multi-Protocol Label Switching (MPLS), Asynchronous Transfer Mode (ATM) and Frame Relay. These solutions are designed in part to compensate for characteristics of the WAN that negatively impact application performance. These WAN characteristics include insufficient bandwidth, high latency, packet loss and congestion.

While these solutions can greatly improve application performance, they complicate the ongoing monitoring and management of the network. This follows in part because these solutions include a broad set of technologies (e.g., compression, caching, protocol acceleration) that the network administrator must become familiar with. It also follows because in order for these solutions to work, they disrupt the normal operations of the network.

Security

The interest in security is driven by multiple factors. One factor is the desire to reduce the number of security incidents and the corresponding financial losses. Another factor is the need to satisfy the requirements set out in government mandates such as HIPAA and the Gramm-Leach-Bliley Act.

Given both the great interest in security as well as the complexity of the problem being solved, many enterprises have implemented myriad security technologies. This includes using protocols such as SSL (Secure Sockets Layer), HTTPS (Hypertext Transfer Protocol over SSL) and IPSec (IP security) that are designed with security in mind. It also includes implementing some or all of the following technologies:

- Firewalls
- Encryption
- Wired Equivalent Privacy
- Authentication
- Intrusion Detection
- Intrusion Protection
- Network Access Control
- Virus Scanning
- Access Control Lists
- Digital Certificates
- Digital Signatures
- Smart Cards

The City Administrator pointed out that due to the deployment of newer technologies, he has no time for tasks (e.g., pulling coaxial cable) that used to comprise the majority of his job in 1990. For example, his organization has made a limited deployment of VoIP, so he spends a small amount of his time implementing and managing the QoS functionality that is necessary to support VoIP. He added that the majority of his current job is focused on issues such as managing the performance of applications, implementing and managing an acceptable level of security and providing wireless connectivity.

The ILEC Engineer commented on the importance of security. He stated that on an average day there are roughly 5,000 attempts to break into his network. The ILEC Engineer also noted that there is a coming together of security operations and network operations. He pointed out that at the same time that the network administrator is monitoring traffic looking for malware such as trojans or worms, he/she should also be monitoring for content violations to ensure that the organization is complying with regulations such as The Sarbanes-Oxley Act (SOX) and HIPAA. The ILEC Engineer went on to say that most organizations implement “layers and layers” of security functionality and that managing all of that “is a fine art.” He did point out, however, that security is a lot easier to implement and manage than it was just a few years ago.

Impact on Network Administrators

Network administrators must be adaptable in order to learn about the continuing stream of new technologies that either already are, or will be deployed in their network. In addition, network administrators must have the desire and the ability to learn the new technologies.

Call to Action: What Does it Take to be a Successful Network Administrator?

As demonstrated in this white paper, the job of the network administrator has changed dramatically. In particular, the role of the network administrator used to be focused exclusively on the network. That does not mean that network issues are still not important – they are. This fact was highlighted by The City Administrator when he stated that if there is a network outage “you can hang your hat on the fact that there will be a house of fire,” referring to the effort put into resolving the outage. The phrase ‘network administrator’ is really a misnomer because in most situations the network administrator is responsible for a lot more than just the network.

The introduction to this white paper made the observation that network administrators historically have only been noticed when the network is down and people cannot access the applications that they need to do their job. In order to understand what it takes to change this situation, it is helpful to analyze what the organization’s CIO expects from a network administrator. The City Administrator stated that his CIO expects that he will keep the network running, but that is no longer sufficient. The CIO also expects that he will keep the applications and security running.

The ILEC Engineer stated that most CIOs realize that the network has been fully deployed and works the vast majority of times. He said that what the CIO is looking for was ways in which the network administrator can enhance performance. He emphasized that his CIO has “zero tolerance for outages.” As a result, what the CIO values is for the network administrator to identify and resolve problems before they impact the customer.

Even though the role of the network administrator has changed significantly over the last several years, there is no reason to believe that the job will not continue to change. With that in mind, the following is a set of ten attributes for what it will take to be a successful network administrator on a going forward basis.

1. Adaptability

Technologies change over time. Network administrators must feel comfortable enough with their abilities so that they do not resist the replacement of a well-understood legacy technology with an emerging technology.

2. Desire to Learn

Going forward, network administrators will be faced with a widening array of technologies that they will have to support. In order to be successful, network administrators must look forward to learning about these new technologies.

3. Ability to Learn

Being both willing and excited about learning is necessary for success, but it is not sufficient. To be successful, network administrators must have the capability to learn about new technologies primarily from on-the-job experience supplemented by whatever the network administrator can gather from reading a manual or a book.

4. Software Fluency

As a minimum, this means the ability to understand the information flow in today's n-tier applications as well as the information flow in the emerging set of Web services-based applications. In some cases this also means the ability to read software code in enough detail to understand at a conceptual level what the code is doing.

5. Tenacity

This never goes out of style for a network administrator. The bottom line is that the problems that a network administrator deals with can be daunting and simple solutions will often not work. To be successful, a network administrator must be tenacious enough to stick with a problem until it is resolved.

6. Attention to Detail

Outages of any sort are no longer acceptable. As a result, network administrators must make sure that anything they do, such as changing the configuration of a router, is done correctly and that it does not cause a network failure.

7. Responsiveness

While eliminating problems is certainly the goal, it is not always possible. In those cases where there is a problem, it is important for the network administrator to respond quickly to the problem – ideally before the end user is impacted.

8. Recognizing IT's Role

A relatively small percentage of companies are in the business of providing IT services. For all of the other companies, the role of IT is to allow the business to function. Successful network administrators must realize this and not be smug about technology.

9. Understanding the Company's business

In order for network administrators to be able to demonstrate business value they need to have a good understanding of the company's key business processes. This type of understanding is necessary in order to ensure that IT provides the maximum business value.

10. Business Acumen

Getting buy-in from senior management requires more than just detailed technical knowledge. It also requires being able to develop a business case – whether that is to demonstrate the ROI of an investment or to demonstrate how an investment in IT improves one or more of the organizations key processes.

Quotes from The ILEC Engineer:

“All the problems of the last decade have gone away. Now it is all software based.”

“Senior managers have zero tolerance for outages. You have to keep outages to an absolute minimum. You need to make sure that any cutovers are successful.”

“You have to be able to put aside the technical toys and consider the business model and what is best for the mission of the company.”

“Young guys need to be able to see what is coming around the corner and prepare for it.”

Quotes from The City Administrator:

“The Internet has changed my job very dramatically. I have become more of an application specialist than a network administrator.”

“I have no time to do the network administration tasks I did ten years ago. What I focus on now is Web-based applications, security, wireless connectivity and connectivity to other networks.”

“To be successful you have to learn quickly, be adaptable, and be a good problem solver.”

“You have to understand the business. I have had to learn a lot about the wastewater business. That knowledge allows me to anticipate questions and add value. That is more important now than ever before.”

“We need to recognize that we are in a service role and that our job is to provide service to a business. We need to be able to show that we can handle the company’s needs.”

“We show our value by being responsive. It is actually good to have a problem and be able to say ‘I took care of that in 10 minutes.’”

“Network administrators need to have some experience with applications. They don’t need to be a web developer, but they need to understand how the key applications work.”

“The title of network administrator will fade over time as the network becomes more automated. The network administrator will spend more and more time as a general IT problem solver.”

Quotes from The Processing Administrator:

“The network administrator has to be able to pick up a book and learn on their own.”

“The network administrator needs the ability to read software and understand the flow.”

Appendix

Jim Metzler

Jim Metzler is a founding member of Ashton, Metzler & Associates. His career to date reflects the type of change that has also impacted the career of network administrators. This includes being a software engineer, an engineering manager for high-speed data services for a major telco, a product manager for network hardware, a network manager at two Fortune 500 companies, and the principal of a consulting organization. In addition, Jim has created software tools for designing customer networks for a major IXC, and directed and performed market research at a major industry analyst firm.

In over 30 years of professional experience, Jim has assisted many vendors to refine their product strategies, multiple service providers to deploy technology and services, and simultaneously helped numerous IT organizations evolve both their technologies and their processes. Jim's current interests include application delivery and the use of Information Technology to enhance business processes. Jim has a Ph.D. in Mathematics from Boston University.

Kubernan™

Kubernan™, a joint venture of industry veterans Steven Taylor and Jim Metzler, is devoted to performing in-depth analysis and research in focused areas such as Metro Ethernet and MPLS, as well as in areas that cross the traditional functional boundaries of IT, such as Unified Communications and Application Delivery. Kubernan's focus is on providing actionable insight through custom research with a forward looking viewpoint. Through reports that examine industry dynamics from both a demand and a supply perspective, the firm educates the marketplace both on emerging trends and the role that IT products, services and processes play in responding to those trends.

Kubernan is the Greek root word for *helmsman* as well as the phrases to guide and to steer. As such, the name Kubernan reflects our mission of guiding the innovative development and usage of IT products and services.

About Ipswitch, Inc.

Ipswitch develops and markets innovative IT software that is easy to learn and use. More than 100 million people worldwide use Ipswitch software to monitor their networks with Ipswitch WhatsUp®, transfer files over the Internet using the market leading Ipswitch WS_FTP® Professional client and Ipswitch WS_FTP Server and communicate via Ipswitch IMail Server. To view the Daily Network Monitor blog, visit dailynetworkmonitor.com. For product and sales information, visit ipswitch.com.