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Supporting Enterprise Networks and Operating Environments

# SUPPORT

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**NaSPA**<sup>®</sup>  
NETWORK AND SYSTEMS  
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## Ten Tips to Realize Value from Big Data and Analytics

By *Brenda L. Dietrich, Maureen F. Norton, and Emily C. Plachy*



## Message from the President

I hope that everyone is taking some time to enjoy the summer.

In addition to dozens of new NaSPA members, we also want to welcome NaSPA Technical Support's new graphic designer, Michelle Robinson. We are excited and we know you will be too when you see what Michelle has done with our magazine. There has never been a better time to advertise with NaSPA so tell your boss or advertising department. You will reach a great demographic and support our noble organization at the same time.

In this month's edition, check out the continuing series by our very own NaSPA member and Board Advisor, Bill Elder, and his colleague Roger Sessions. In the final article of their series, *Doing the Math on I.T. Complexity*, Part III there are some noteworthy tips for IT professionals. Are you concerned about a free and open Internet? Karl Volkman is – and frankly so am I! Read his insightful article *Net Neutrality- Should the Technology Industry be Worried?* Karl addresses what's at stake for all of us as well as what we can do to keep the Internet free and open. Finally, do you need to know how to estimate the size of a planned application and measure the size of an existing application? Then, *A Guide to Sizing and Estimating Projects* by David Garmus is the article for you.

So, what's new and exciting, at your company? We want to hear from you! What would you like to see in your magazine? Do you have a review on the newest gizmos and gadgets? Send us your reviews, your comments, etc. We love getting them and we really do look at everything that people send us.

Have you checked out the new middle section of this magazine for jobs? A lot of people like it, and it's interesting to read even if you are not presently in the job market. If you ARE in the job market it's indispensable – along with your expansive [job site](#).

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Leo A. Wrobel, President  
Editor in Chief Technical Support Magazine  
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# New Data: Employees Using Mobile Devices for Work even if not Supplied by Employer

*theEMPLOYEEapp™ Survey: Internal Communications Affects Job Satisfaction and Employee Engagement*

*Mobile Technology Allows for Direct and Instantaneous Access between Employers and Employees*

NEW YORK, NY (May 20, 2014) — The manner in which employers communicate with their employees has a direct impact on employee engagement and job satisfaction according to theEMPLOYEEapp's 2014 Employee Communications Satisfaction Survey of more than 325 U.S.-based workers.

The survey looked at the importance of communications to employee engagement and job satisfaction as well as current and preferred methods of employee communications. In answering the question, “does the way in which your employer communicates with you impact your job satisfaction,” the majority, 65%, said yes.

Given the recent proliferation of mobile technology, the survey also sought to determine the extent to which employees use mobile devices for work and how legacy communications methodologies are currently being utilized by an increasingly mobile workplace.

Jeff Corbin, Founder and CEO of theCOMMSapp™, a family of communications app building solutions that includes theEMPLOYEEapp for secure, internal communications, said, “theEMPLOYEEapp's 2014 Employee Communications Satisfaction Survey confirms that communications in the workplace is not only changing due to advancements in technology, but is a critical part of an employee's job satisfaction and overall engagement. A recent Gallup Organization study on workplace engagement found that 70% of the workforce is not engaged in their job and, as a result, this costs corporate America \$550 billion in lost

revenue every year. Based on the results of our survey, employers have an opportunity to increase engagement and reduce lost revenue simply by changing the way they communicate.”

## **Mobile devices proliferate even if not part of company driven policy**

The way in which people do their work is changing. TheEMPLOYEEapp survey found that only half (53%) of those surveyed spend the majority of their time (75% or more) behind a desk. The other half reported spending their day at non-desk settings that include factories and warehouses, agriculture/farming, field service (e.g., television, telephone, Internet, etc.), on-the-road, among others.

Given that many employees are no longer desk-bound and with the recent proliferation of mobile technology, theEMPLOYEEapp survey inquired as to employee preferences when it came to the use of mobile devices in the workplace. With regard to mobile device ownership:

- 96% of those surveyed possess a mobile device:
- 42% were provided with such device by their employer;
- 58% did not receive a device from their employer, but still purchased one on their own;
- Of those who purchased a device on their own, 66% used it for work related purposes.

Corbin said, “Having recently attended Apps World 2014 in San Francisco, companies of all sizes – small, medium and enterprise – are beginning to recognize that they need to consider mobile strategies not only for communications, but for many other aspects of their business. Whether or not a company supports a Bring Your Own Device (BYOD) policy, employees are using their devices in their jobs. Employers have an opportunity to take advantage of the power of these devices to improve communications and hence, engagement.”

Corbin added, “With regard to communications specifically, the mobile device enables something that until recently did not exist – the ability to connect and communicate directly and instantaneously with a targeted audience. Employees are one, if not the most important audiences of any company or organization. until recently did not exist – the ability to connect and communicate directly and instantaneously with a targeted audience. Employees are one, if not the most important audiences of any company or organization. The mobile device presents an immediate solution for employers to connect with and directly engage with this audience.”

### **Not all current communications methodologies are well-suited for mobile**

According to the survey, 93.4% reported that email is the most common way in which employers currently communicate important, company specific information to their employees. And, without a better solution, email is the preferred method by which employees want to receive company news (87%). Other methods in which employees receive company information include:

- In person – **54%**
- Corporate Intranets (SharePoint) – **33%**
- Mobile apps – **29%**
- Conference calls/webinars – **25%**
- Internal social collaboration networks (SharePoint, Yammer, Jive, Salesforce Chatter, etc.) – **14%**

With regard to utilization of these platforms on mobile device, 82% of those with corporate Intranets said they either have never tried to access this channel via their mobile device or have a difficult time doing so. Similarly, with regard to social collaboration networks, 78% of those who have such networks have either never tried to access them or have a difficult time doing so via the mobile device.

Corbin said, “Given the early stage in which mobile is becoming incorporated into business processes, it is not surprising that email remains the primary internal communications method. Nevertheless, based on our many conversations with communications professionals, it is becoming clear that employees are overloaded with emails. As a result, important employee communications are being missed.”





He concluded, “The fact that employees find it challenging to access corporate Intranets and social collaboration tools via mobile is likely a result of organizations maintaining legacy communications systems that were originally developed for desktop computers. Based on current research on the use of corporate Intranets and as can be determined from our survey, trying to make legacy systems responsive to the mobile device is like trying to fit a square peg in a round hole. Given the ability to directly connect with employees through their very personal mobile device, theEMPLOYEEapp Survey therefore suggests that employers could benefit from a mobile first communications strategy – this will go a long way towards improving job satisfactions and employee engagement.”

### About theCOMMSapp

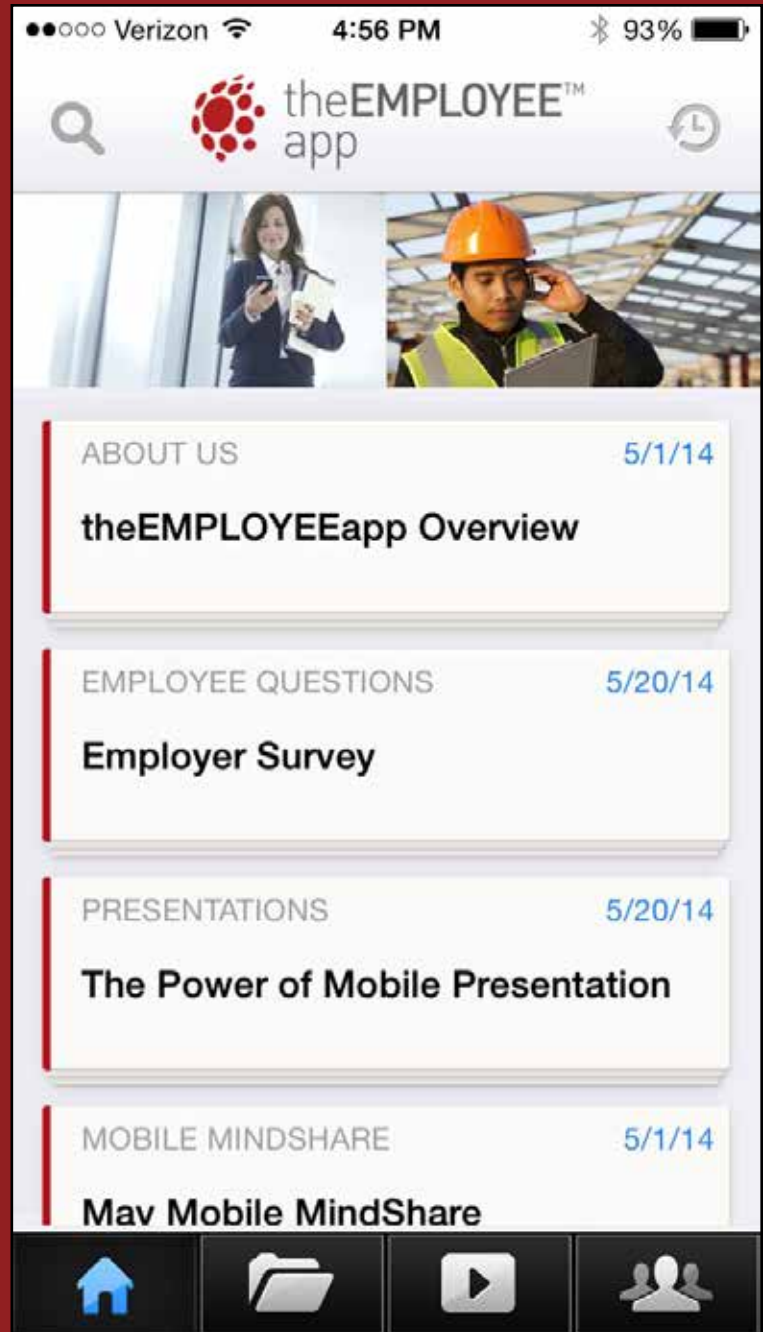
[theCOMMSapp™](#) is a family of communications app building solutions that includes theIRapp® (for public companies and funds), theEMPLOYEEapp™ (a secure employee communications mobile portal) and theCOMMSapp (for external communications).

It allows any organization that has a defined and targeted audience to have direct access to these important individuals and to optimize its content for iPhone, iPad and Android mobile devices. In only a few weeks, any company can have their own app available on Apple’s App Store and Google Play to provide important company information that can include presentations, videos, audio podcasts, photographs, media placements (print and broadcast), fact sheets and marketing materials. Companies can also stream live events through the app.

*For more information about theCOMMSapp visit [www.theCOMMSapp.com](http://www.theCOMMSapp.com) and follow the company on Twitter @theCOMMSapp.*

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# OneNeck® IT Solutions Prepares to Break Ground on Tier 3 Data Center in Denver Metro Area

*\$20 million project will be OneNeck's first data center in Colorado; company secures incentives from the Board of Douglas County Commissioners.*

**ENGELWOOD, Colo. (May 20, 2014)**— [OneNeck® IT Solutions](#) today announces preparations are nearly complete and construction will soon be underway on its new \$20 million, 35,000 square foot Tier 3+ data center in the Denver metro area. The data center will be being built on 11.2 acres of land on Concord Center Drive in Englewood. Once open, in early 2015, it will be the seventh data center owned and operated by OneNeck in the U.S.

“We are excited to make this additional investment in the Denver area,” says Phil LaForge, president and CEO of OneNeck. “Our data center will be built to withstand natural disasters, which means area businesses can rest-assured their IT infrastructure is safe, protected, and always accessible in our new Tier 3+ data center.”

The multi-phase project is designed for rapid expansion, in up to five phases, totaling 160,000 square feet. It will also be able to support data center modules. The project leverages a personal property tax rebate and construction fee waivers provided by the Board of Douglas County Commissioners to build in the southeast corner of the Denver metro area.

“In an effort to continue strategically supporting investing in projects that provide a strong economic foundation for Douglas County, we are proud to support OneNeck in this endeavor,” states Jill Repella, Douglas County Commissioner. “We believe in providing an environment where businesses can succeed. For this reason, it is a pleasure to team up with OneNeck on their data center build, a project that will certainly add to our community’s economic growth.”

About 30 local companies will be involved in the construction of the building. Denver-area contractor JE Dunn Construction will coordinate the project with support from INVISION Architecture, Faith Technologies, and North American Mechanical.

When the doors open in 2015, the data center will resemble other OneNeck data centers in the Midwest. [This facility](#) will be built to support common compliance requirements such as SSAE 16, PCI-DSS, and HIPAA among others. It will also include many state-of-the-industry features, such as:

- Three factor security authentication, including iris scanners for personnel identification
- Up to 16” thick steel-reinforced concrete walls, roof and floors
- Ultra-quick responding VESDA (Very Early Smoke Detection Apparatus) fire detection system
- Tier 4 electrical system with multiple levels of redundancy and backup
- Energy saving cooling design with a projected PUE of 1.2 or less
- Efficient use of space with a 5kW per cabinet average power density (the normal Colorado home uses about 1 kW), with maximums at 4 times that, or 20kW



“We also plan to deploy ReliaCloud in the new data center to provide businesses with a local cloud solution,” LaForge says.

[ReliaCloud™](#) is an enterprise-class IT Infrastructure as a Service (IaaS) solution specifically designed for resource intensive applications and databases that necessitate a secure and compliant operational framework. It’s built with industry-leading products and capabilities from Cisco, EMC, and VMware.

“We appreciate the county board’s support and trust in us,” LaForge added. “We look forward to maximizing this opportunity and, ultimately, to making it an economic success for the county, area businesses, and OneNeck.”

Today’s announcement follows the October 2013 news that [Englewood-based MSN Communications was being acquired](#) by Telephone and Data Systems. The acquisition and then [unification as part of the OneNeck IT Solutions master brand](#) – combined with today’s announcement – adds to the company’s strategic direction, which includes building its Tier 3 data center portfolio and delivering tailored end-to-end IT solutions.

OneNeck [announced earlier this year](#) the expansion of its data center in Eden Prairie, Minn. These projects are part of OneNeck’s strategy to provide local, yet highly secure, Tier 3 or better data center space for business owners who prefer to be close to their IT infrastructure.

Find out more about [OneNeck](#) and the planned [data center in Denver](#).

**For more information, contact:** Cindy Tomlinson, Associate Manager – Public Relations / OneNeck IT Solutions / 608.664.4471 / [cindy.tomlinson@tdstelecom.com](mailto:cindy.tomlinson@tdstelecom.com)

OneNeck® IT Solutions LLC, a wholly owned subsidiary of Telephone and Data Systems Inc., employs approximately 650 people throughout the U.S. The company offers a full suite of IT solutions including cloud and hosting solutions; ReliaCloud™ enterprise cloud services; managed services; ERP application management; professional services; and IT hardware. OneNeck owns and operates four Tier 3 data centers in Iowa, Minnesota, and Wisconsin and manages two Tier 2 data centers in Arizona. Visit [oneneck.com](http://oneneck.com) for more information.

TDS Telecom, headquartered in Madison, Wis., operates OneNeck® IT Solutions LLC and TDS Baja Broadband LLC. Combined, the company employs 3,100 people. Visit [tdstelecom.com](http://tdstelecom.com).

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# Doing the Math on IT Complexity: Part III of III

By Bill Elder and Roger Sessions

In the first article in this series, we discussed the cost of IT complexity. In the second article, we looked at a number of Enterprise Architectural approaches and why they fail when it comes to addressing complexity. In this article, we start by considering what an Enterprise Architectural methodology must include to credibly claim to address complexity and then we look at one specific approach that does address the problem of IT complexity.

## THE BASICS

There are four capabilities that must be included in any credible approach to managing IT complexity.

**1.** The first is a *definition for IT complexity*. Complexity means different things to different people. Any model that claims to address complexity must start by defining what it is that it addresses.

**2.** The second is a *model for understanding IT complexity*. We need some understanding of what it is we are controlling if we are to control it.

**3.** The third is a *metric for measuring IT complexity*. We can't test the success of the approach unless we can measure the complexity of the before and after state.

**4.** The fourth is a *process for removing IT complexity*. We can't remove complexity unless we understand the steps in the process needed to remove it.

## THE SNOWMAN PRACTICE

The Snowman Practice is an approach to IT complexity reduction that has been introduced by one of the authors of this paper, Roger Sessions. To our knowledge, it is the only methodology today that includes all four of the basic capabilities required for an IT complexity management strategy. The Snowman Practice is so-named because it defines an optimal IT architecture (from a complexity perspective) as a strongly vertically partitioned architecture that, when diagrammed, bears a strong resemblance to groups of Snowmen as shown in Figure 1.

The Snowman Practice can be broken down into four main areas, corresponding to the basic complexity management capabilities.

The Snowman Taxonomy includes a definition of IT complexity taken from CUEC (Consortium for Untangling Enterprise Complexity) guidelines. In this Taxonomy, IT complexity is defined as follows:

Complexity is the attribute of a system that makes that system difficult to use, understand, manage, and/or implement.

The Snowman Architecture describes the model for understanding complexity. This model includes understanding the business functions supported, the interdependencies between technical functions, and the distribution of technical functions among services.

The Snowman Metric describes a specific process for measuring the complexity in an IT system. It applies exponentially increasing weights to function count and dependency count.

The Snowman Iteration Process describes a step-by-step methodology for building an IT architecture with the least complexity possible. It includes the following steps:

- *Identification of business functions*
- *The partitioning of business functions through synergy analysis*
- *The projection of the business function partition through both the technical and data architecture.*

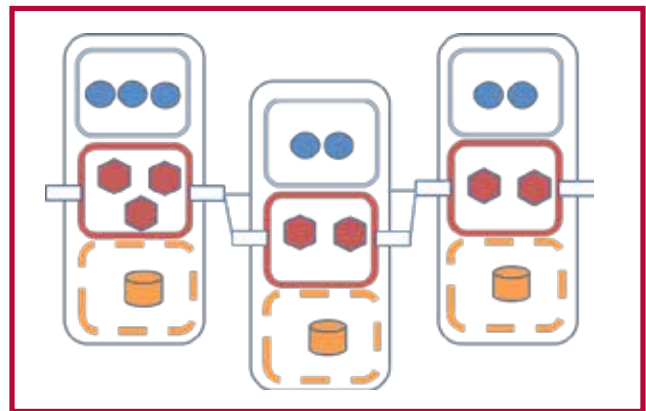


Figure 1. A Diagram of a Snowman Architecture



## RELATIONSHIP TO OTHER METHODOLOGIES

The Snowman Practice does not attempt to duplicate functionality that is addressed in other methodologies. For example, TOGAF™ does a good job of setting forth a process for defining a business architecture, a technical architecture, and a data architecture. However it does not give any advice on how to do so in a way that embraces simplicity as a driving architectural goal. The Snowman Practice supplements TOGAF by defining how a project can be partitioned into smaller, simpler, autonomous pieces (Snowmen) that can then individually be filled in using the TOGAF (or some other) approach.

## THE PATH FORWARD

If you are going to want to build a large IT system that embraces simplicity as a driving architectural goal, you will need to incorporate a comprehensive complexity management strategy. Many consulting companies promise to offer such a strategy. How do you choose? The starting point is to ask the vendor some pointed questions:

- *How do you define complexity?*
- *How do you model complexity?*
- *How do you measure complexity?*
- *How do you drive the architecture to the simplest solution?*

If the vendor cannot answer each of these questions, then you should continue your search elsewhere.

## QUESTION AND ANSWER WITH ROGER SESSIONS

**NaSPA:** It seems that SIP has many applications in addition to managing IT projects. Could you tell us how SIP could also help with simplifying business processes and supply chains?

**Sessions:** The mathematical laws that govern complexity are independent of the domain we are looking at. So in business systems, complexity is also determined by functionality, dependencies between functionality, and partitioning of functionality among subsets. So the same methodology that is used to simplify IT systems can be used to simplify business processes and supply chains.

**NaSPA:** You recently wrote about applying SIP to simplifying Data Center operations. Could you please elaborate on that aspect of SIP?

**Sessions:** When we have done a good job of partitioning large complex systems, we end up with simple packages containing related functionality. As long as the structural integrity of the packages is maintained, the packages have a great deal of flexibility as to where they run. This makes it easy to migrate packages onto consolidated machines, to the cloud, to small clusters of machines, or where ever it is most cost effective to host them.

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**NaSPA:** In Part II of this series we mentioned the challenges of using the Zachman and FEA frameworks in managing IT complexity. How can SIP help make these frameworks more effective?

**Sessions:** These frameworks all work well with SIP. The basic strategy is to partition using SIP before engaging with these other frameworks. Once we have partitioned the large system into small autonomous pieces, then we can apply these other frameworks to what they do well, namely, describing business architectures, defining requirements, and driving IT architectures for small, relatively autonomous systems.

**NaSPA:** It seems that one of the biggest challenges to bringing SIP to a project is getting buy in from senior management and overcoming corporate culture resistant to change. Do you have any suggestions for getting cultural buy in for using SIP?

**Sessions:** My experience is that unless an organization has experienced the problems complexity causes, we won't be able to convince them to engage in a strategy of managing complexity. Once an organization has been burned several times with multi-million dollar failures, then we can come in and show them a better way. Occasionally you will meet a CIO who has the vision and foresight to address complexity before it has become a crippling problem, but these CIOs are very rare indeed.

1. For more on The Snowman Architecture see <http://simplearchitectures.blogspot.mx/2012/09/snowman-architecture-part-one-overview.html>
2. For more on The Snowman Metric, see The Mathematics of IT Simplification available at: <http://simplearchitectures.blogspot.mx/2011/10/sip-complexity-model.html>
3. For more on the Snowman Iteration Process (formerly called Synergistic Iterative Partitions), see The Mathematics of IT Simplification available at: <http://simplearchitectures.blogspot.mx/2011/10/sip-complexity-model.html>

Roger Sessions is the CTO of ObjectWatch. He has written seven books including Simple Architectures for Complex Enterprises and many articles. He is a past founding member of the Board of Directors of the International Association of Software Architects, Editor-in-Chief of Perspectives of the International Association of Software Architects, and a Microsoft™ recognized MVP in Enterprise Architecture. He has given talks in more than 30 countries, 70 cities and 100 conferences on the topic of Enterprise Architecture.



Bill Elder is a consultant who is employed by Knight Point Systems ([www.knightpoint.com](http://www.knightpoint.com)), a federal IT contracting firm based in Reston, VA. Bill is a certified software tester and a past member of NaSPA's Board of Directors. He is originally from Pennsylvania where got his Public Policy degree from Penn State University. Bill now lives in the Northern Virginia suburbs of Washington, DC.



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Actuary - Midwest USA - ACAS/FCAS  
w/Pricing skills - Specialty lines  
D.W. Simpson Global Actuarial Recruitment  
Wisconsin, United States

CDHS - Colorado Department of Human Services  
Food and Energy Assistance Division Director  
Denver, Colorado, United States

Building Inspector II  
Stanislaus County  
Modesto, California, United States

Associate Engineer (Mechanical or Chemical)  
Metro Water/Barbara Siewert  
California, United States

Senior Loss Prevention Representative  
Alliant Credit Union  
Des Plaines, Illinois

Deputy Director  
ACDI/VOCA  
Washington, Dist. Columbia, United States

Technical Director  
ACDI/VOCA  
Washington, Dist. Columbia, United States

Actuarial Lead - Europe - ACAS/FCAS  
with Advanced Property & Casualty Knowledge  
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Litestream Holdings  
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Vice President for Advancement  
Eastern University  
St. Davids, Pennsylvania, United States

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Pagiel Schechter, MD, Inc.  
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Actuarial Analyst  
Ezra Penland Actuarial Recruitment  
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Maintenance Planner  
Graphic Packaging, Int'L  
Pacific, Missouri, United States

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Fairview Health Services  
Burnsville, Minnesota, United States

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Upo: United Planning Organization  
Washington, Dist. Columbia, United States

Professional Oportunities  
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Actuarial Careers, INC.  
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Taproot Theatre Company  
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# Net Neutrality – Should the Technology Industry be Worried?

By Karl Volkman, Chief Technology Officer of SRV Network, Inc.

Network neutrality, most commonly referred to as net neutrality, is a hot button topic in the United States. The debate gained momentum recently as the Federal Communications Commission's (FCC) latest proposal opens the door for broadband providers to prioritize and charge websites for faster access to content. Previously, Internet access has been a non-discriminatory service with Internet Service Providers (ISPs) providing the same service to all users, companies, content, etc.

## ***Taking a Look Back***

Network neutrality is not a new concept by any means. One of the earliest examples of network neutrality dates back to the 1800s with the telegraph. As the communication form gained popularity, the switchboards were starting to get busy and at times backed up. As a result, transmitter terminals placed a priority on government messages and allowed those urgent messages to bypass other communications for faster responses.

Now, the Internet is facing a similar issue and in 2010 the FCC issued an Open Internet Order, which stated that ISPs cannot block, slow down or discriminate against data flow across networks. In a sense, what was a general rule of thumb became a government regulated process. Verizon Communications challenged the ruling and the end result is the newest FCC proposal with the option to charge for faster access.

## ***What's at Stake?***

The biggest issue at the heart of the debate examines whether or not ISPs should be allowed to give preference to those who place a monetary importance to their content. A prime example of how ending net neutrality will impact the Internet and its users follows.

Netflix has gained immense popularity in recent years for its video streaming service. SO much so that some have estimated nearly 30 percent of all US Internet usage during peak times is from Netflix traffic. As a

result, ISPs believe Netflix should pay additional costs for their immense traffic.

And they did, Netflix signed deals with both Comcast and Verizon to improve the quality of its video streaming service. The deals formed a partnership commonly referred to as "peering," which typically does not involve the exchange of money and has been outside the scope of regulated net neutrality. However, the Netflix deals did involve money and as such have placed power in the ISPs' hands. As a result of the deal, the ISPs promised improved streaming to Netflix users, which had been subjected to slow speeds and interrupted streams.

However, much to the chagrin of Netflix, users on Verizon and AT&T began receiving error messages once again. Netflix's error message called out the ISP and stated "The Verizon network is crowded right now. Adjusting video for smoother playback..."

The ISPs argued the slow speeds are Netflix's fault for sending too much traffic to their networks, while Netflix argued equal access to content was a privilege for all Internet users and threw the blame back to ISPs.

## ***The Support for Net Neutrality***

Those in favor of net neutrality desire equal access to content for everyone, no matter how much traffic is being sent to or from a website. But the debate dives much deeper than that. In addition, proponents are worried that the control of data is at risk if ISPs can prioritize content. In doing so, ISPs can place a preferential advantage on content as they deem fit, whether that's because a website is paying higher fees or for outside reasons. Though most companies with in-house websites are limited by the bandwidth of their Internet drop, the ending of net neutrality indicates the potential for a prioritization of certain customers' traffic over others – resulting in potentially biased treatment that is outside of the company's control. If a tiered

model is established, websites as small as a blogger could be faced with fines for preferential treatment by ISPs.

Similarly, supporters of net neutrality worry that innovation will suffer as a consequence. It's possible that the deals ISPs make with established businesses will prevent small companies from having a chance at the competition. With net neutrality in place, small start-ups are treated the same as jumbo sites like Amazon or ESPN as far as streaming quality and content to access goes. The current business world is exploding with creative start-ups, imagine if they couldn't afford to compete with established businesses.

Furthermore, there is also the looming concern of monopolies within the cable industry. Already, nearly one-third of Americans have access to only one broadband provider and the pending Time Warner-Comcast merger threatens to control and astonishing 40 percent of the U.S. broadband market.

Large companies, like Netflix, and ISPs will both see profit increases if net neutrality fails. Large companies will have the ability to pay the higher fees, but it'll undoubtedly come at the expense of higher prices and charges for consumers.

### ***Two Sides to Every Story***

As evident with the Netflix and ISP battles, the Internet is a huge source for profits – and companies are willing to fight for a tiered system with deep pockets backing their arguments.

A pinnacle argument against net neutrality is the notion that the government should not have a role in regulating the Internet. Considering previous examples of government regulated industries including public schools, the post office or health care, is enough to make ISPs run the other way. ISPs see more room for innovation and competition when the government does not regulate their service.

Additionally, why should everyone be treated equally on the Internet when one website attracts 50 users per month and another 50 million? The two websites aren't operating on an even level and ISPs argue that they shouldn't be treated as though they are. The solution is higher fees and preferential "fast-lanes" for those who are drawing more traffic to their site.

Lastly, consider the amount of money ISPs are placing to develop their infrastructures. Billions of dollars are invested to create the fastest, most reliable networks,

which requires continual updates and significant time. If ISPs are encouraging websites to pay fees for faster connections, imagine how the competition within ISPs will spur to create the fastest network. It's likely that ISPs will be more motivated to create innovative solutions that offer better access and availability for everyone, not only those who pay more.

### ***Cause for Concern***

Though the exact amount is unclear, there will undoubtedly be changes for those in the tech industry once the FCC rules on net neutrality. The extent to how much our start-up community will be impacted is unclear, but after all of the recent innovation from start-ups, we hope it won't suffer too much.

All businesses are advised to review contracts, monitor streaming services and be aware of how much traffic is being driven to their sites. For now and for the foreseeable future, the debate will continue to move forward. Within the technology industry, the best thing we can do is support creativity, innovation and share how each proposed idea will impact content users.

Karl Volkman, the Chief Technology Officer of SRV Network, Inc. in Chicago, Illinois, is an IT Professional with over 30 years of experience. Prior to his position at SRV Network, Karl was the Director of Technology for the New Lenox School District 122 in Illinois, the Chief Information Officer of the Habitat Company in Chicago, and the Manager of Networks & Communications for John Nuveen and Company. Karl's certifications include HP, Microsoft, Cisco, Adtran, Objectworld, and Cymphonix. His capabilities include IT Management, Planning and Technician, Telecomm Technician, Programmer, DBA, and Technology Instruction.

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# A Guide to Sizing and Estimating Projects

By David Garmus

Stakeholders involved with the development of software are frequently challenged to provide early and accurate software project estimates. It speaks poorly of the software community that accurate estimation practices, early in the lifecycle, have not been adequately resolved and standardized.

Three significant issues play a role in the estimating challenge:

*The need to identify and express, as early as possible in the project, the application software functional requirements requested by the user.*

The need to identify and express the application software non-functional requirements taking into account all of the technical and quality issues for the project.

The need to understand the software development team's capability to deliver the required software solution within a specified environment taking into account all of the risk factors relating to the environment and people's skills and motivation. Once these issues are resolved, the effort required to deliver the product can be more accurately predicted.

The software requirement can be defined as the scope of the required software functionality impacted (to be built or customized) by the project activities as well as the technical and quality issues. The software requirement must be accurately identified by users or those individuals who have requested the software to be built, and then assessed for its size and complexity. To complicate the situation, experience tells us that at the point in time when we need an initial estimate (early in the system's life cycle), we typically do not have all of the necessary information available. Therefore, we must follow a relatively rigorous process that enables a further determination of the requirements.

Functional size can be measured using the International Function Point Users Group (IFPUG) functional size measurement method discussed in the

IFPUG Counting Practices Manual [1], based on the functional user requirements. Function Point Analysis measures the functionality requested and received by the user independent of the technical and quality details involved. Function Points provide a more precise measurement of software size and are designed to remove the ambiguity from consideration of the software being examined. Instead of an abstract notion of size, we derive a more accurate estimate of a project's size. Function Point Analysis conforms to the ISO/IEC 14143-1:2007 standard for functional measurement.

IFPUG has recently developed a sizing measure that can be used to size nonfunctional requirements for the development and delivery of a software product known as Software Non-functional Assessment Process (SNAP), which is presented as a separate chapter in this book. The main objective of IFPUG's Framework for Non-Functional Sizing (2008) project was to provide a non-functional framework that could be used to establish a link between non-functional size and the effort to provide the non-functional requirements. The non-functional assessment provides information that can identify requirements that impact quality and productivity by quantifying the size of non-functional requirements of the software that the user requests and receives. The resulting framework has been released by IFPUG as the SNAP Assessment Practices Manual [2].

Having both Function Point data and non-functional requirements provides a more complete and accurate picture of software development. However, the SNAP scope will always be limited to the "product" non-functional requirements assessment, rather than including "external" requirements related to the organization delivering the project/product. Organizational, personnel, and support requirements for the project certainly have an impact on the overall project effort estimation, but they are not included in the SNAP point calculation.

Risk factors relating to the environment and people's skills and motivation influence the organization's capability to deliver. The identification and assessment of these project risks should also be completed at the beginning of each project when a project manager is better positioned to develop a plan that works. The resulting plan should focus on the project team's capability and capacity to deliver requested functionality in accordance with customer requirements. In the world of continually evolving technologies, project managers face ever-increasing challenges in managing software development projects. Is your organization building software with new technologies in new environments? Client/Server platforms, multitiered architectures, object-oriented design, web-based users, and e-business customers are the norm today. If you are facing the technology revolution, your project managers may need new skills to succeed in today's complex software development environments. A project manager should not commence a project without evaluating the team's capabilities, before committing to an estimate of time and effort. An effective project manager focuses on the successful delivery of quality software within time and budget constraints. Once the project manager understands the delivery capability of the team's current resources, he or she is better positioned to quantify the size (scope) of each project and develop project plans with remarkable precision, plans that work!

It is recommended that project managers follow an ISO standard for sizing software that has the flexibility to modify estimates as the project progresses. Experience tells us that although a project manager needs an estimate early in the development process, the estimate is rarely based on complete information. Therefore, the project manager should follow a rigorous estimating process that permits further clarification of the requirements as the project proceeds through the development cycle. The methodology should enable an estimate to be quickly revised and subsequent changes to be captured while maintaining the basis of the original estimate.

Effective estimation requires that a historical baseline of performance including size, resources, and schedule be maintained. An organization should develop profiles that reflect rates of delivery for projects of a given functional size, nonfunctional assessment, and risk. In turn, this information can be used to predict and explore "what-if" scenarios for future projects.

An effective estimating model, as shown in Figure 1, considers three elements: size, non-functional assessment, and risk to determine an estimate.

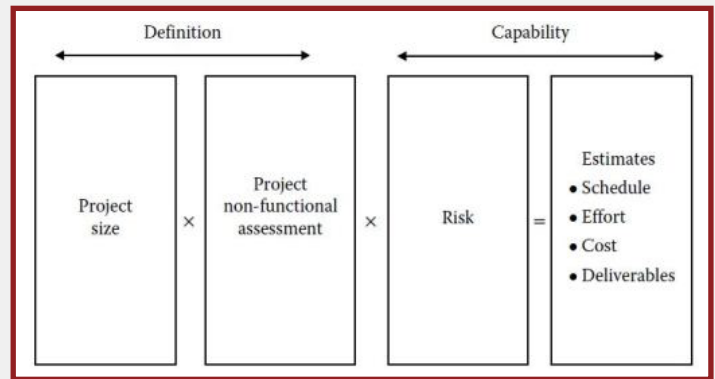


Figure 1. Estimation Model

## Project Size

By far, the project-sizing technique that delivers the greatest accuracy and flexibility is the IFPUG Function Point methodology. Based on logical user-defined requirements, IFPUG Function Points permit the early sizing of the software requirement. In addition, the IFPUG Function Point methodology presents the opportunity to size a user requirement regardless of the level of detail available. An accurate Function Point size can be determined from the detailed information included in a thorough user requirements document or a functional specification. An adequate Function Point size can even be derived from the limited information available in an early proposal.

The IFPUG Function Point methodology is dependent upon identification of five elements: inputs, outputs, inquiries, internal stores of data, and external references to data. Within the IFPUG methodology, these are known as external inputs, external outputs, external inquiries, internal logical files, and external interface files. During the early stages of development, these elements are exposed at a functional level (e.g., an output report will be required although the detailed characteristics of that report might not be known). The Function Point counting methodology identifies these five elements. As more information becomes available regarding the characteristics of these elements (that is, data attributes, file types referenced, and so on), the more detailed the Function Point count becomes. During the early phases of a count, it may be necessary to assume levels of complexity within the system (e.g.,



is the report going to be simple or complex). Point values are assigned to each transactional and data function using tables contained in the IFPUG Counting Practices Manual. The value in the concept of using IFPUG Function Points is that it allows for accurate functional sizing, and in fact requires it early in the process.

Function Point Analysis permits us to estimate the size of a planned application and measure the size of an existing application. It can also be used to measure the size of changes to an existing application, whether those changes are in the detailed design phase or have already been completed. Knowing the functional size allows many other useful metrics to be determined.

Alternative sizing methods, such as counting lines of code, are dependent upon information that is not available until later in the development life cycle. Other functional measurement methods require detailed knowledge about system processing that is not available early enough for accurate counting, for example, states and transitions.

IFPUG Function Points accurately size the stated requirement. If the requirement is not clearly or fully defined, the project will not be properly sized. When there are missing, brief, or vague requirements, a simple interview process with the requesting user can be conducted to more fully define the requirements. Function Points can be utilized to better identify stated external inputs, external outputs, external inquiries, internal logical files, and external interface files. For an average size project, hours, not days, are required to complete the diagramming and sizing task.

## **Non-Functional Assessment**

In addition to the project size, a non-functional assessment must be performed for the project. Before IFPUG's Framework for Non-Functional Sizing was developed, earlier versions of the IFPUG Counting Practices Manual acknowledged the existence of 14 general system characteristics (GSCs):

- 1. Data communications**
- 2. Distributed data processing**
- 3. Performance**
- 4. Heavily used configuration**
- 5. Transaction rate**
- 6. Online data entry**
- 7. End-user efficiency**
- 8. Online update**

### **9. Complex processing**

### **10. Reusability**

### **11. Installation ease**

### **12. Operational ease**

### **13. Multiple sites**

### **14. Facilitate change**

Each of these 14 characteristics was assigned a degree of influence between 0 and 5; consequently, the total degree of influence ranged between 0 and 70, which then was applied in a formula to become a value adjustment factor to the Function Point count. Although this was part of the Function Point methodology for many years, IFPUG embarked upon the effort to replace these GSCs through the use of SNAP, a more realistic and practical methodology to establish a link between the non-functional size and the effort to provide the non-functional requirements.

The SNAP assessment provides information that can identify items impacting quality and productivity by quantifying the size of non-functional requirements of the software that the user requests and receives. ISO has defined technical requirements as those requirements that relate to the technology and environment for the development, maintenance, support, and execution of the software. ISO has defined quality requirements as those characteristics that form part of the quality model: functionality, reliability, usability, efficiency, maintainability, and portability. SNAP offers a project assessment method that uses a series of questions grouped by category to measure the impact of non-functional requirements on the development and delivery (size) of the software product. The result will be the size of the non-functional requirements, just as the functional size is the size of the functional requirements.

Categories focus on those non-functional requirements that impact the development and delivery (size) of the software product but exclude on-site specific organizational factors that impact development effort and project duration but do not affect the delivered product size. Categories are generic enough to allow for future technologies. Each category includes subcategories or individual components, which are evaluated using assessment questions in order to produce an estimated impact of the category on product size.

Categories and subcategories include the following:

- **Data operations**
- **Data entry validations**
- **Logical and mathematical operations**
- **Data formatting**
- **Internal data movement**
- **Interface design**
- **UI changes**
- **Help methods**
- **Multiple input methods**
- **Multiple output formats**
- **Technical environment**
- **Multiple platforms**
- **Database technology**
- **Configuration**
- **Batch processing system**
- **Multiple technologies**
- **Architecture**
- **Mission critical (real-time system)**
- **Component-based software development (CBSD)**
- **Design complexity**

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Assessment questions for each subcategory are related to specific attribute(s) that allows for the non-functional assessment of the given subcategory. Ratings will be ranges, qualitative values, ordinal values, and so on, depending upon the particular subcategory. Ratings are converted into SNAP counting units (SCUs); the SCU can be a component, a process, or an activity identified according to the nature of the subcategory. The complexity level of an assessment rating or the value of the SCU within each subcategory is mapped to a size, which is the arithmetic sum of the sizes of all SCUs identified in each subcategory. SNAP points are the final non-functional size obtained by combining all category values.

#### References

1. The International Function Point Users Group. 2010. Function Point Counting Practices Manual, Release 4.3. Princeton Junction. New Jersey: IFPUG Standards.
2. The International Function Point Users Group. 2011. SNAP Assessment Practices Manual. Princeton Junction. New Jersey: IFPUG Standards.

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# Ten Tips to Realize Value from Big Data and Analytics

By *Brenda L. Dietrich, Maureen F. Norton, Emily C. Plachy*

What does it really take to derive value from Big Data and Analytics? Co-authors of *Analytics Across the Enterprise: How IBM Realizes Business Value from Big Data and Analytics*, Brenda Dietrich, Emily Plachy and Maureen Norton, identify 10 top tips based on their years of experience at IBM “eating their own cooking.” Interviews with more than 70 executives, managers and analytic practitioners across IBM yielded 31 case studies across 9 different business functions which show the breadth challenges, outcomes, analytics techniques, and lessons learned to make your analytics journey to realize business value successful.

## 1. Create a Strong Culture for the Availability and Use of Data

A strong analytics culture is foundational for getting the most out of big data and analytics. How can you create this culture? Let’s take an example. Think of yourself as the Vice President of Sales for a company. You have called several of your sales managers together to discuss the coming quarter and expected shortfall in revenue. You ask for input on how to optimize the available resources to drive better results. The sales managers start sharing ideas including reassigning resources and new accounts to go after. You respond, “What data do you have to support that? Is this gut-feel supported by facts?” If you are at IBM you would ask the sales manager, “Have you followed the recommendations in the Coverage Optimization for Profitability analytics model?” This example illustrates that encouraging employees to use data to support their assertions can get the whole team thinking about data-driven decision making. Changing culture is never easy – expecting decisions to be fact-based is a good start.

## 2. Build a Team with the Right Skills

Solving a business challenge using big data and analytics requires a collaborative and multi-disciplined team. A person with expertise in the business is essential. Skill in the business processes is particularly valuable. Also key is an IT person with data expertise in the business. Finally, you need an experienced data scientist or analytics practitioner to understand and prepare the data and to develop and evaluate the analytics model.

## 3. Estimate the ROI for your Project

The Return on Investment (ROI) of an analytics project can be estimated through a disciplined methodology that identifies key value drivers for the business area and assesses costs (for example, estimates of time, talent, software costs, training costs, Subject Matter Expert (SME) time). Value driver trees are an effective way to determine the benefits the project can drive. Identify the key value drivers for the process and quantify the impact that an improvement in that process could drive. Existing research and SME input can guide the value tree development and quantification of both hard and soft benefits. Once you understand those value levers you can estimate the expected return. It is important not to underestimate the training costs of getting people to use the analytics within the business process. Change is hard and some end users will require more knowledge of the tool than others.

## 4. Start with the Data you Have

Waiting for perfect data can take time, causing you to miss an opportunity for action. Use analytics techniques that can fill in gaps in imperfect data so that business value can be realized. Think about the jigsaw puzzle analogy that IBM Fellow Jeff Jonas uses to illustrate this point. Each piece of the puzzle represents a transaction or data. As you put more of the puzzle pieces together it becomes easier to complete the puzzle; in fact the last piece of is the easiest to put in. Even without the last few pieces of the puzzle you are likely to have enough context to infer what the missing pieces would be like. Analytics can be used to fill in those gaps like the last few pieces of the puzzle so that business value can be derived sooner.

## 5. Deliver Results Iteratively

Rather than planning to develop a large analytics solution in several years, with one delivery at the end, put a stake in the ground to drive progress and get results. Iterative development of analytics solutions has several advantages. First, it allows you to obtain feedback from your stakeholders and target user group early. This feedback may cause you to have to make adjustments, which are much easier to make early than later. As soon as you have a working prototype,



you can use it to create buy-in from your target users. Second, developing iteratively decreases the time to value.

## **6. Engage Target Users Early**

Deploying a new analytics solution widely is key to increasing the amount of value realized by an enterprise. Every target user who fails to use the analytics solution reduces the value realized. One of the best ways to help your target users buy into your new solution is to expose them to an early prototype both to allow them to see what the prototype can do and to get their feedback. Fortunately, those following tip 5 will have an early prototype. By way of example, a team developing a new quality detection solution needed a way show why yet another quality detection solution was needed. They asked target users to provide historical data containing their gnarliest problems so that this data could be fed into the prototype. The prototype team was not told what the problem was. The prototype identified some of these historical problems 6 weeks earlier than the tradition quality detection solution did. These results caused the target users to look forward to the new solution.

## **7. Use Proven Analytics Solutions even if you do not Understand the Underlying Analytics Technology**

Analytics is a broad field encompassing a range of techniques for extracting insight from data. Many of the techniques have been verified both through rigorous mathematical methods and through extensive evaluation and have been made available for use as robust software packages or services. Understanding when and how to use the methods is essential; understanding exactly how the methods work is not. Just as most users of digital technology, ranging from cameras to music players to cell phone, don't understand the details of how sound or light is converted into bits to be stored or transmitted, and then converted back to sound or pixels to be enjoyed, it is not necessary for users of analytic methods to understand how the analytic algorithms process numerical data to find correlations or patterns, or explore a set of possible solutions to pick the best one. It is, however, important to understand when the use of a method is appropriate and how to interpret the output of the method. As in any technical field, in analytics there will be a small number of people who create new methods and a larger group of people who create new applications of methods (both old and new), and a very large group of people who use the applications to create enterprise or personal value.

## **8. Take Action from Insight to Realize Value**

Analytics is often described as the process of extracting insight from data. While insight is far better than hindsight or no-sight, insight alone does not create value for an enterprise. It is insight, coupled with actions inspired or influenced by that insight, which can create value. Of particular value is insight that allows you to understand the likely result of specific actions. Then you can select from

among possible actions the one most likely to produce the desired result. Further, using advanced analytic methods such as mathematical optimization, you can use this type of insight to understand and evaluate complex multi-part decisions, such as the allocation of scarce resources among activities. Finally, it is important to consider the action(s) taken, the expected result, and the actual result as additional data. This data should be further analyzed to gain additional insight that can be used to influence future decisions. This final step makes analytics an adaptive and learning process, which can continually improve outcomes.

## **9. Measure to Gauge Success**

The primary reason for running a big data and analytics project is to achieve a business outcome. In order to know if a business outcome was achieved, the outcome must be measured. As an example, a proactive retention project used predictive analytics to identify high-value employees with a propensity to leave the company. Human Resources (HR) knew the attrition rate of high-value employees in the previous year. After predicting which high-value employees were likely to leave, HR increased salaries or paid retention bonuses. Attrition of high-value employees for the current year decreased. Measurements allow you to evaluate progress and decide if the outcome is acceptable or if additional measures should be taken to improve the outcome.

## **10. Share Big Data and Analytics Assets across Business Units to Drive Additional Value**

In addition to being used to support individual decision processes, analytics can be used to facilitate collaboration and learning within an enterprise. The simple act of agreeing on the source and meaning of data can bring together process teams from different organizations within an enterprise. Discussion of how the different data elements are used, whether for measurement and reporting or for decision making, can lead to greater understanding of the overall drivers of enterprise performance. Further, identifying the various decisions that are made based on this data in the end-to-end execution of business can lead to both better alignment of unit measurements and the identification of opportunities for collaboration. In the transformation of IBM's supply chain, analytics revealed opportunities to share both physical and information resources between units to better serve customers. It also enabled collaborative decision making between IBM and its distributors.

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In 1986 our principals made disaster recovery history when we were the first in America to locate a disaster recovery center inside a telephone office. Today we offer a phone company-grade disaster recovery service "in the cloud." We serve police, fire departments, 911 centers, universities, banks, credit unions and others in conjunction with their local phone company. If your service provider is a member of our network, our service can be conveniently charged on your your phone bill. If not, no problem. We can sign you up directly and activate you in days.

Hear it yourself. Dial 1 (866) 501-8430 now for recorded information from our actual system. Better yet, why not sign up for our free online demo held EVERY WEDNESDAY. Discover how to keep your business running, and yourself in control, when it matters most.

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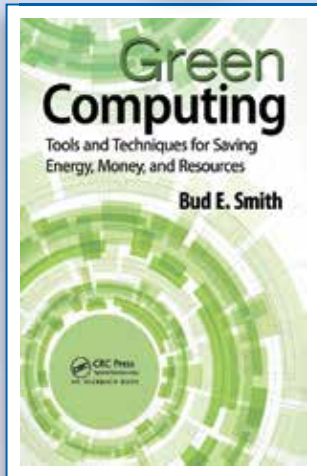
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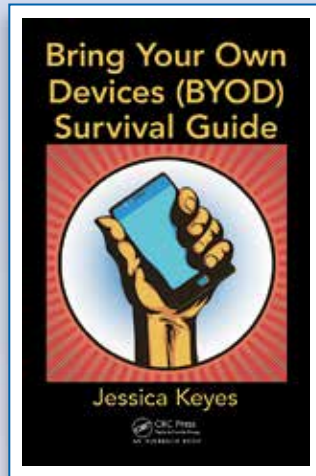
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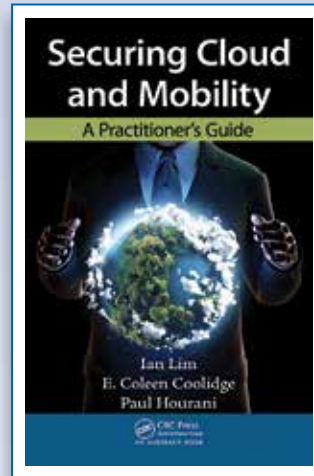
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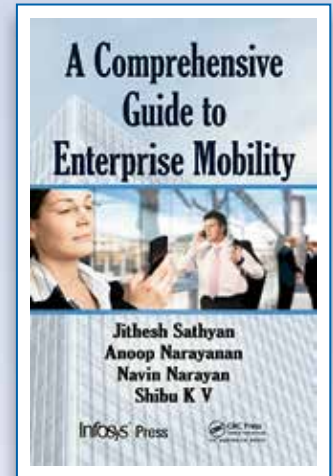
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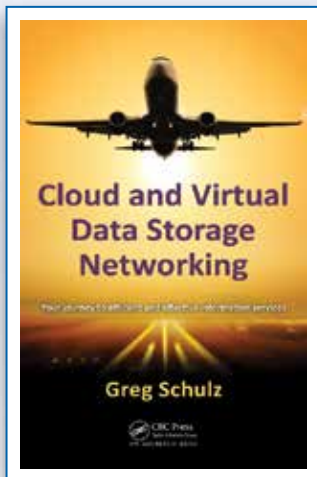
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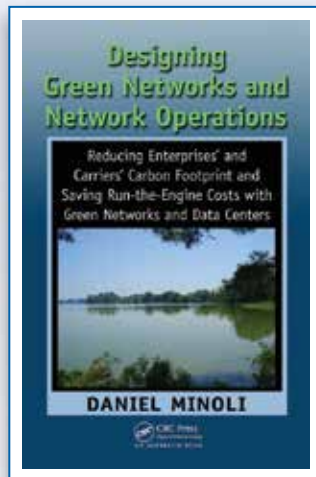
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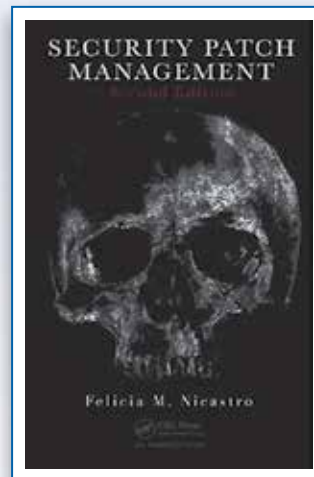
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