

The Case for IT Network System Documentation



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A business can get away with little to no system documentation when an organization is small and computer technology less developed.

As you grow, it becomes more important to make the time to document your system. A system of documentation makes it easier to troubleshoot issues that may arise and to have a snapshot to build from, for future improvements. I've found it wise to be leery of technologists who want to improve things with new technology that cannot show me a visual representation of how things look today.

NOTE: Many times we are requested to come in to assist with documentation after the separation of a current system administrator from an organization. Sometimes this occurs weeks or months after the prior administrator left and in many of these cases, the departure was on less than desirable terms. If this is your situation, please focus more of your efforts on the removal of potential remote access capabilities and administrative user accounts. Most people would not connect back and attempt to do anything harmful but better to be safe than sorry.

How to gather network details

It can be a struggle to determine exactly *what* to document or *how* to gather the details.

This document aims to make it easier for an executive, manager or system administrator to make the push for your initial system documentation.



Some of the ways that we craft our initial documentation for a new client include:

- We issue a *Call for Materials* to find out what existing documentation our client might already have. We would still want to verify the content, but no need to start from scratch if someone has already gathered important information.



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- We look through records such as hardware, software licenses and media in the IT area, as well as IT purchasing requests still available through the accounting department. Reviewing the email mailbox of the current or prior administrator might yield important information such as ISP information, online purchases of IT assets, important license-related keys/serial numbers, technology exchanges with software vendors or partners and other useful information.
- You might glean useful information from executive or department head interaction with your primary IT person or vendor. You could also create a structured interview for your end-users and gather some tidbits, though many times they are so focused on their specific tasks they may not remember much for a large investment of time.
- There are all kinds of scanning tools that can help you gather information on your network resources. For example the utility Belarc is a great free resource to run on each individual PC or server and build out a detailed profile of all the hardware, installed software and related information.

http://www.belarc.com/free_download.html

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Benefits of system documentation

While we only briefly touch on some of the benefits of system documentation, there are many. Those interested in system documentation probably understand that documentation is a critical part of any System Development Life Cycle (SDLC). Besides documentation helping with troubleshooting, as I mentioned earlier...

- Good documentation doesn't just show what things are, but helps drive an understanding of how the systems work together.
- Good documentation creates a permanent record, or snapshot, of how things are implemented today.
- Good documentation can help facilitate effective communication between your technical resources and your less technical end-users.
- Good documentation helps you stay organized on how you can improve your network.



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- Good documentation helps you control system development and maintenance costs.
- Good documentation helps maintain standardization, improves efficiency and therefore saves money.
- Good documentation can be used to help train new users or new administrators.
- Good documentation of your system can also benefit similar projects or help you scale out your current design.
- Good documentation is a requirement in your compliance or internal audit efforts.

Suggested initial system documentation package



Here is my list of the **Top 10 things your initial system documentation should contain**. Your actual system design and components might dictate specialty or more focused documentation efforts. There are many approaches and philosophies to good network design.

If you have more than two engineers in a room discussing good design, you'll have at least three different opinions on the best way to accomplish. I'm going to break these areas into different kinds of documentation - **lists, flowcharts and maps**. Each type of documentation serves a slightly different purpose and might gather slightly different content.

Lists are collections of like pieces of information with any "interesting" characteristics. **Flowcharts** are visual representations to help explain the how of users, data and systems working together. **Maps** are visual representations of systems that can sometimes be more explanatory than a list by itself.

- 1) **List of assets** - Your list of assets is one of the most fundamental parts of your documentation. It is probably the easiest to gather but one of the more tedious to maintain. We usually start with a list of assets on the network because that can be gathered with a variety of different scanning tools and include additional and important information, such as the network's IP address. Other important bits of information might be the network's age, warranty status, logged on user, version and so forth.



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The list can give an executive a heads up if a significant portion of assets are older than the three or four year expected lifecycle or help the system administrator understand if an important fixed asset is missing.

- 2) **List of users and groups** - Business networks are much easier to maintain when attention and focus is given to a solid design of users and groups. Windows networks running active directory have the ability to ease administration through the power of group memberships. These group memberships should mirror your real world business so that people with similar duties and capabilities have access to what they need but nothing more. This is called the principle of least privilege. Executives should be concerned if employees are members of the domain administrators group where people could have access to payroll data, protected information or other people's emails. Administrators should be concerned about old employees or test-users that are still valid on the network but those people are gone. Most hacking efforts began with a compromise of a single standard user.
- 3) **List of software** - I consider this separate from list of assets partially because you might gather them differently but also because most network people focus on the physical assets but most executives and end users tend to be more concerned about their applications. In conjunction with your list of users and groups, your organization will benefit if every user in a specific group that needs a piece of software has that software and at the correct version. Executives are usually concerned that their businesses waste their own time and money from a lack of standardization of software. It also makes it harder for an Administrator to maintain the software if nobody knows who is supposed to be using what software. There's nothing more de-motivating for an end user than getting a brand-new PC but suffering for weeks because software is missing that no one knew about until they started trying to use it.



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Administrators also want to make sure the proper security software, like antivirus, is installed on all the servers and PCs in their environment. It might also be helpful to know if there is the proper backup software or agent installed to help protect data local to the resource. So much malware targets software vulnerabilities such as your operating system, but also includes applets like Adobe Reader, Flash, Shockwave, Apple iTunes/QuickTime, Java, Windows Media Player and others.

4) **List of shares** - On a business network there is the ability to create file and print shares to help centralize and standardize resources used by groups. A file share is a folder on a server that you want one or more groups have access to. Permissions can prevent or allow users or groups to have access or to set limits on the level of access. Printer shares are helpful to manage access to network printers and likewise enable the automated installation of printing and distribution of print drivers for user groups. If you only have a single server, this may be less needed for you but an executive would still want to know what user groups have access to which shares, or to ensure their most important data, like a QuickBooks file or payroll spreadsheet, is limited to only a few necessary users. A system administrator could also place descriptions on the share names to make usage a little more obvious or enable file logging to generate a log entry for every user who accesses a file inside specific folders.

5) **List of passwords** - There are several key passwords in every Windows environment. There are one or more Domain Administrator passwords that allow the owner full access to everything on the network. There are service accounts with passwords that are typically specially set aside to run key applications that need enhanced privileges. There are server and workstation level administrator passwords that can give the owner full access to everything on that server or workstation.

And there are privileged passwords for firewalls, switches, printers, network devices, antivirus programs, backup programs, accounting



packages, ISPs, domain registrars, key applications, and support vendors. You want to make sure you know what those passwords are.

If you are an executive and your network administrator or support vendor does not want to print a list of these for you to store in your lockbox, you should be concerned. System administrators should make it changing passwords from their default a habit before placing assets on the network, and likewise documenting them before proceeding with advanced configuration, so the password is not forgotten or missed. It can make the difference between getting locked out of the system or actually getting to enjoy your vacation (enjoyment which can come to a screeching halt when someone has to call you to get the password needed).

6) **Business flow chart** - In IT consulting, we talk about aligning technology to the business. We have to first understand the business to facilitate alignment. Put another way, I can do many different things with a standard computer network but I need to understand what we are trying to accomplish before I attempt to design. Business flow charts would look at your top organizational processes to understand how your different departments and teams work together. Mapping things like your quoting process, sales to collections workflow, how you service specific classes of clients, new employee onboarding process and others could help your system administrator better design technology to support these workflows. The best thing about business flowcharting is that executives and/or non-technical people should be able to help create the flow of how things should happen. Understanding how your specific business operates can help your Administrator make strategic decisions on where to smartly invest additional capital to make your technology life better.

7) **Data flow diagrams** - These visual representations show the flow of data through your local area network and cloud systems. They could show where files are stored, which database servers are associated with key applications, where faxes come into, scanning goes out to, or just where



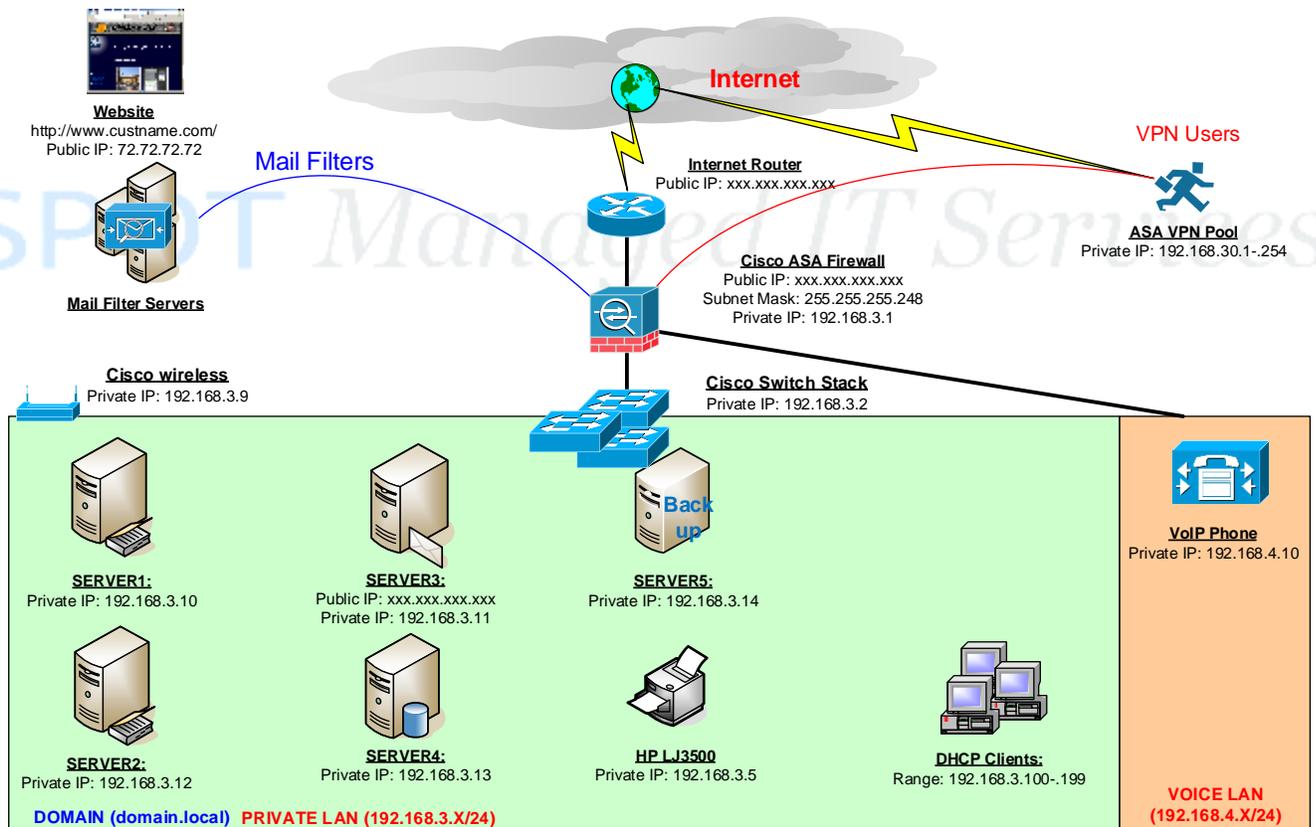
services are running. A single application like an ERP/ EHR platform might have three or four servers with one file store, one SQL Server, one web front end and a core application server. Similar to your business flow chart, these graphics represent how all systems work together, ideal for troubleshooting and architecture. Many software vendors have standardized maps representing these data flows and you just need to put your specific server names on a re-created version and Microsoft Visio or similar drawing program. These are very important for both executives and administrators, as we spent a lot of time unraveling mysteries but once that particular mystery is solved, we move on. Creating this documentation helps preserve that tribal knowledge for ourselves in the future or for future support needs.

- 8) **Physical network diagrams** - Physical network diagrams are typically important for more complex environments. Since network devices, firewalls and servers can have multiple interfaces or be configured to split out traffic in different ways, physical diagrams are ways to record what's plugged in where. These tend to be most helpful for your core switch that everything is plugged into. Organizations that employ server or storage virtualization, have security needs or are bound by compliance such as PCI, HIPAA and others, tend to use more. You can also have other physical diagrams such as a rack elevation pointing out the name and/or IP address of every server and device in a specific rack. Support is easier and better with system documentation, before you need it. A rack map can make it so any person can easily determine which physical server is the one that needs attention because you have identified the hostname, IP address and maybe even what applications are running on it. You don't need extra stress during critical support situations
- 9) **Logical network diagrams** - Just because everything is plugged into the same physical switch doesn't mean it's been configured to all work together in the same VLAN or domain. This is where logical network diagrams are better in helping illustrate what resources are designed to



be together. The growth of ransomware and other security threats has brought the need for data classification from the government and high-security environments into more small businesses. We add security by compartmentalizing important data from the rest of the network.

A good logical network map will identify sections of the network that are separated for security or performance reasons. I find executives can make the most sense out of the logical network map as there is more of the big picture sense to what technology is where and how it's different. Administrators can use the logical network map to better articulate the design to executives and support vendors introducing solutions and technology into their environment.



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	Description: Company Logical Network				
	Software: Visio		Ver: 6.0.1245	Revised: Steve Meek	
	Filename: Template- Network- Single site.vsd				



10) **Server diagrams** - If you have a single server environment, your technology is mostly in the cloud or have a highly distributed environment across multiple small sites, you may not have a need for a server diagram. But after 20+ years of IT support and design, I still find one of the most common issues in a small business network are the result of a poor Windows infrastructure design.

In the world of Microsoft Windows, proper network operation requires a solid and consistent structure for IP addressing, resolving names to IP addresses and domain time management. This requires the administrator to build a quality design for:

- *IP addressing details*- IP addresses are like phone numbers for resources on the network. These very basic settings also have related information such as subnet masks (like an area code grouping) and default gateway (like a country code to get to the next hop).
- *Domain Name System (DNS)* is mapping of names for computers, services or any resource connected to your network to its private IP address. If an IP address is like a phone number then your internal DNS is like a phonebook matching a name to a number.
- *Dynamic Host Configuration Protocol (DHCP)* is a standardized tool to automatically handout IP addresses to PCs, laptops and other devices when you plug it into the network. They are designed to make it easy for non-technical users to plug in and go right to work.
- *Network Time Protocol (NTP)* is a means of synchronizing clocks over your network so they work together. On Windows, a five-minute deviation between a workstation and your key servers can introduce problems, by design, for security reasons.
- *Domain Controllers (DCs)* are the brains of a computer network. They hold centralized information about users, their permissions, groups, policies you want the domain to adhere to and other centrally controlled settings. It's best to have two DCs if you want to add redundancy to your network but this requires additional configuration.



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- *Flexible Single Master Operations (FSMO)* are operations masters, or a collection of priority features run on your DCs. They allow multiple network brains to work together and always come to an agreement.

Final thoughts on system documentation

The goal of this article was to help an executive manage their IT person/team/vendor and begin the process of system documentation. When starting with documenting your network it is less important to ask, "why don't we have all of this?" and more important to ask, "where can we get started on this list?"

Remember that your system administrator probably has to balance his time across supporting all end users, keeping the network running and system documentation. While I firmly believe that system documentation is one of the most important conditions for a smooth-running network this is partially tainted by the fact that we have supported maybe over 400 networks over the years. There is no way to remember all of those specifics, so documentation is a great defense. But I do find administrators of organizations that have a tendency to ignore documentation, or state that they have it all in their heads, tend to have the most misconfigured network implementations.

Also please note, the best managed IT shops have way more system documentation than this, and some of our clients have special situations where our help desk benefits from having more involved diagrams, or simple things like server room photographs, to help us remotely support them.

Coupled with documentation should be other standard network management capabilities such as availability or performance monitoring, event logging, remote support, patching, trend analysis and security tools.



My martial arts instructor used to say that a black belt was just the beginning of true knowledge. In the same way, system documentation is just the first step to computer network enlightenment.



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