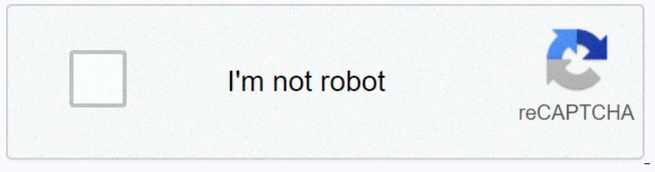

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Top down network design phases

According to Albert Einstein: The world that we have created as a result of the level of thought that we have done so far creates problems that cannot be solved at the same level on which we have created them. To investigate Einstein, networking experts have the ability to create networks that are so complex that they cannot be solved in problems using the same type of thought that was used to create networks. Add to this the fact that any upgrade, patch, and network change can also be created using complex and sometimes disgusted thinking, and you are aware that they are the result of a network that is difficult to understand and fix problems. Networks created with this complexity often do not perform as well as expected, do not reproduce, as there is a need for growth (as almost always) and does not match customer requirements. The solution to this problem is to use a streamlined, systematic methodology in which a network or upgrade is designed from top to bottom. Many of the network planning tools and methodologies in use today are similar to the connect-the-dots game that some of us played as kids. These tools allow you to place Your Internet work devices on a pallet and connect them to local area network (LAN) or wide area network (WAN) media. The problem with this methodology is that, based on these requirements, it skips the steps of customer request analysis and the choice of devices and media. Good network design should recognise that customer requirements embody a number of business and technical objectives, including availability, scalability, affordability, security and manageability. Many customers also want to determine the required level of network performance, often called a service level. In order to meet these needs, difficult network planning and trading choices must be made when designing a logical network before selecting physical devices or media. When a customer expects a quick response to a network planning request, a bottom-up network planning methodology (connect-the-dots) can be used if customer apps and targets are well known. However, network designers often think that they understand the apps and customer requests only to find that they have not captured the most important needs of the customer after installing the network. As the number of network users increases, unexpected scalability and performance issues occur. You can avoid these problems if the network designer uses top-down methods that perform a request analysis before selecting the technology. Top-down network design is a network planning methodology that starts in the upper layers of the OSI reference model before moving to the lower layers. It focuses on applications, sessions, and data transfer before selecting routers, switches, and media that work in the bottom layers. Procedure from top to bottom includes includes sharing and group structures to find the people for whom the network will provide services and from whom they should get valuable information in order for the design to succeed. The design of the top-down network is also iterative. To avoid too fast-shre tingeding details, it is important to first get a comprehensive view of the customer's demands. Later, more details can be collected on protocol behavior, scalability requirements, technological preferences, and so on. The top-down network design acknowledges that the logical model and physical design can change as more information is collected. Since the top-down methodology is iterative, some of the topics in this book are covered more than once. For example, this section deals with network applications. Network applications are discussed again in Chapter 4, Determination of network traffic, which covers network traffic caused by application and protocol usage patterns. The top-down approach of the network designer can first get a big picture and then spiral down into detailed technical requirements and specifications. Continue reading here: Using a structured network planning process Was this article helpful? While the theme may sound dull and analytical, top-down network design is actually more complex, incorporating not only technical requirements, but also understanding the various business factors that influence the network you design. In this article, Sean Wilkins walks through this approach to network design and examines a number of factors that go into an effective system that puts the needs of the organization first. Like this article? We for all those people who are already bored with the title of this article, I will try to do it succinctly enough to be interesting and help with everyday network designs. Network design is something that sounds interesting to many people, but you can also get it into a boring, analytical task that is less interesting for a typical network engineer who wants to get his hands dirty. Some of this is true; the design phase of most projects requires a level of analysis and analytical tasks that require an understanding not only of the technical aspects of the networks, but also of the business factors affecting the network. This article see the concept of top-down network design. This is one of the common methods used to create networks, where it focuses first on the needs of the company. The top-down design is not a process limited to network planning; is a concept that can be applied to many other applications. Top-Down network planning is simply an analysis of the needs of high-level companies. Instead of starting the design with the choice of equipment, the design begins with the company's requirements and needs information on the analysis and with it the design based on high functional requirements. Next sections provides a brief overview of the different phases used in the design of the Top-Down network; these include: Analyzing business objectives and limitations Analyzing technical objectives and trading that are specific to existing Internet work, which is typical of network traffic Analyzing business goals and limitations One of the most important parts of network design involves careful review of existing business objectives and constraints. Often, when these are not taken into account at the beginning of the project, unnecessary changes must occur in the middle of the project, which can have a major impact on the project's schedule and budget. When reviewing the company's goals, it is important to gather as much information as possible from as many sources as possible in order to have a complete picture of the business from multiple perspectives. For example, if the view is only from above, many things that happen in important trenches can be missed and vice versa. It is in this part of the project that the scope of the project must also be calculated. How the project is handled and whether it is supported by all the departments within the company that will be affected are important issues. If not, it is important to address inter-cooperation issues before the start of the project; this will ensure a smoother transition of the project. These issues are also addressed below as business constraints. At this stage of the project, it is also important to understand in detail current network applications, as well as any additional network applications that will be searched in the future. This information is crucial in the context of the design process from a business and technical point of view. The second equally important part of this phase is the analysis of business constraints. There are various aspects of network planning that need to be carefully completed; include careful accounting of policy within the company. Many projects are hampered or stopped by various political factions within the company. It is important that each of these factions is happy when the project affects their areas of activity. Budget, staff and planning issues should also be carefully addressed to ensure that the project has the resources to successfully complete the project. After establishing organizational requirements and documenting an existing network, the designer is ready to create a network solution. This section first addresses the top-down approach to network planning. Decision tables and structured design are described, and the section includes a brief discussion on the types of network planning tools that can be used. The section concludes with a discussion on the construction of the pilot or prototype and the content of the detailed design document. The top-down approach to network design Planning of a large or even medium-sized network can be a complex project. Procedures have been developed planning process by splitting it into smaller, more manageable steps. The identification of separate steps or tasks ensures a smooth process and reduces potential risks. The top-down design allows the designer to see the big picture before the details come to light. Topdown design explains the design objectives and triggers design from the perspective of the required applications. The top-down approach adapts the physical infrastructure to the needs of applications. Network devices are selected only after a thorough analysis of the requirements. Structured design practices should be integrated into the top-down approach, particularly in very complex networks. Unlike a top-down plan, the network design approach, which first selects network devices and technologies, is called bottom-up or connection-dot. This approach often makes it an inappropriate network for the requested services and is mainly used when a very rapid response to the design request is required. With a bottom-up approach, the risk of re-designing the network is high. NOTE These estimates do not include the time required to prepare detailed network diagrams if they are not shipped by the customer. The guidelines for making a top-down model include the following: ■ Thoroughly analyse customer requests. ■ Start the design from the top of the OSI model. In other words, first specify the upper layer axes (application, presentation, and the view) and then specify the lower layer axes (transport, network, data connection, and physical)– the infrastructure (routers, switches, and media) that is required. ■ Collect additional network information (protocol behavior, scalability requirements, additional customer requirements, and so far) that can affect logical and physical design. Customize your plan for new data as needed. Top-down approach Compared to the bottom-up approach The top-down approach has many advantages compared to the bottom-up approach, Including the following: ■ Incorporating the customer's requirements ■ Providing the customer and the designer with the big picture of the desire network ■ Providing a design that is appropriate to both current requirements and future development The manu of the top-down approach is that it is more time-following than the bottom-up approach; requires analysis so that the design can be adapted to the identified needs. The advantage of a bottom-up approach – choosing devices and technologies and then moving to services and apps – is that it enables a quick response to the design request. This design approach enables design based on the designer's previous experience. The main drawback of the bottom-up approach is that it can lead to inappropriate design, leading to costly diversion. Intermediate (IS-IS), Enhanced Interior Gateway Routing Protocol (EIGRP) and BGP. Five required parameters are listed, along with an indication of how well routing protocols are consistent with these parameters. As indicated in the figure, the selected protocol must include the following features: ■ It must support a large network. All protocols under consideration shall comply with this requirement. ■ It should focus on businesses and not on your ISP. BGP has been designed to support the interconnection networks of autonomous systems; is not optimized for use in the company. IS-IS is typically used in service provider environments rather than in companies. ■ Variable length subnet mask (VLSM) support is required. All protocols that are considered to support VLSM. ■ This should be supported on Cisco routers, as is the case for all protocols being considered. ■ Network support staff must have good knowledge of the protocol chosen to enable them to troubleshoot network problems. In this case, network support personnel are known about the EIGRP, but not about OSPF, IS-IS or BGP. Structured design Output design should be a model of the perfect system. A top-down approach is highly recommended. Instead of focusing on network components, technologies, or protocols, focus on business goals, technical goals, and existing and future network applications and services. The structured design focuses on a systematic approach that divides the project task into connected, less complex components, as follows: ■ First, identify the applications needed to support customer requests. ■ Then define requirements for logical app connectivity, focusing on the necessary infrastructure services and network infrastructure. ■ Functionally divide the network to develop a network infrastructure and hierarchy requirement. ■ Each functional element is designed separately, but in relation to other elements. For example, network infrastructure and infrastructure models are closely linked; both are bound to the same logical, physical and functional models. Use a top-down approach for all models. Figure Structured design Example In this case, network infrastructure planning and infrastructure service planning are closely linked; both are bound to the same logical, physical and functional models. These elements are logically divided. Network infrastructure planning is divided into physical topology, design, routing planning and technology selection. Planning infrastructure services is divided into QoS design, security design and multicast design. All design phases use a top-down approach. Network design tools Several types of tools can be used to facilitate the task of creating a complex modern network, including ■ Network modeling tools: Network modeling tools are useful when there is a lot of input design information (such as customer requests, network audit results and analysis, etc.). Network modeling tools allow you to model both simple and complex networks. The tools process the information provided and return the suggested configuration, which can be modified and reworked to add redundant links, support additional sites, and so. ■ Strategic analysis tools: Strategic analysis or what-if tools help designers and other people working on design (engineers, technologists, and business and marketing experts) to develop network and service plans, including detailed technical and business analysis. These tools try to calculate the effects of specific network components with simulated scenarios. ■ Decision tables: As discussed, decision tables are manual tools for selecting specific network characteristics from multiple options based on required parameters. ■ Simulation and verification tools or services: These tools or services are used to verify the acquired design, thus reducing the need to run the pilot network. The figure shows how information about the initial requirements is processed using network design tools for network design Image: Using network design tools To verify network design, which was created using network modeling tools, strategic analysis tools, and decision tables, use simulation and test tools, or build a pilot or prototype network. The pilot or prototype network also creates proof of concept that confirms the adequacy of the design design. Production of a prototype or pilot network • The pilot network tests and verifies the design before starting the network or is a subset of the existing network in which the design is tested. • The pilot network is usually used when the design for a completely new network; pilots can also be used for models that add to the existing network. • Prototype network tests and check the redisign in the isolated network before it is used for an existing network. The prototype network is usually used to verify the plans to be implemented on an existing network infrastructure. It is important that the pilot or prototype tests the design, including the most important customer requirements. For example, if the key requirement is a minimum response time for remote users, make sure that the prototype or pilot checks that the maximum acceptable response time is not smoked. A prototype or pilot performance can have one of two results: ■ Success: This result is usually enough to prove the design of the concept. ■ Error: This result is usually used to correct the design; the prototype or pilot phase is then repeated. In the case of small deviations, the design can be corrected and tested prototype or pilot network. The documentation of the Plan A plan shall include requirements for the planning, documentation of the existing network and network planning, the definition of the strategy and results to demonstrate the concept, and the details of the implementation plan. The final design structure of the document should be similar to that in Figure 2-26, which includes the following: ■ Introduction: Each design document should contain an introduction to present the main reasons leading to network design or network redesign. ■ Planning requirements: Even a mandatory part of any project document, this section includes the organization's requirements and design goals to be met. ■ Existing network infrastructure: This section is only required for network redisign. Subseas documented results of existing network characterization steps. ■ Design: This section is an essential part of the project document and provides details of the design and implementation of a simple new deployment of services, for example), but usually include topology, title and design. Implementation details, such as configuration templates and precise network device configurations, are included for the execution process. ■ Proof of concept: This section describes the results of the verification of the pilot or prototype network. ■ Implementation plan: This section details the implementation details that technical staff must carry out as quickly and unsu progress as possible without the presence of a designer. ■ Add-ons: Add-ons typically include lists and, if desired, configuration of existing network devices. Picture: Model Design Document

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