
WEEK -2 IT INFRASTRUCTURE ASSIGNMENT

1. Write in detail about the design issues involved in IT organization and IT infrastructure.

IT infrastructure management issues that your organization may face and some solutions that may help you to solve the problem.

1. Lack of some powerful computing platforms

Challenge: One of the major challenges in this technological era is the lack of energy and space to power supercomputers. IT managers always look to have better and faster systems which help in processing the large chunk of data available today.

Solution: A simple solution to overcome this challenge is to employ new general purpose graphical processors or multi-core platforms. For using the better systems, the existing software has to be optimized for better results. There are many projects that have been started on developing faster computers which will be made available at low costs and energy needs.

2. Data acquisition problems

Challenge: The firewalls which help in protecting the emails, applications and web browsing can cause in losing packets in TCP/IP networks. This results in loss of important data and reduces the speed of the network considerably which in turn will make the online collaboration impossible. Similar losses can occur due to the switches and routers which don't require a high-speed memory.

Solution: The IT managers require to look at the high-performance computing resources with a huge data set and a secure bridge to collaborate with the dispersed scientific teams. They also need to employ a more sophisticated means of collection, filter and store using high-speed networks.

3. Compute management and provisioning

Challenge: One of the biggest challenges for the IT managers is to manage the huge chunks of data. For this, they would require high-performing computers. The major challenge for the IT managers is to simplify the tasks and speed up the processing.

Solution: One solution to solve this challenge is by using the distributive systems. With the help of these systems, one can divide the complex tasks into smaller independent bits and can be processed by the individual computers which are connected to a network. The grid computing consists of virtualization resources and also supports the computations across multiple administrative domains and helps in speeding up the processes.

4. Lack of Efficient Data Storage Architectures

Challenge: Cloud storage is one of the best technologies available today. Even though it is one of the most cost-effective and scalable alternatives for data storage, it does not include all the required data architecture which can accommodate a variety of applications. This vast community of IT needs something which is more flexible which is beyond space and can be included in this cloud storage options.

Solution: The cloud options need to be more flexible. It should be easy to optimize the cloud solutions according to the application deployed. They need to be more vulnerable, reliable and efficient to handle the variety of applications. These cloud storage options need to serve as a long-term for the IT community.

5. Improper networks and connectivity

Challenge: For a smooth work balance in any organization, it is important to have a good and reliable network in place. Without having a reliable network connection, IT infrastructure management it can be a difficult task for any IT manager of the organization. There are new software-based methods and network architecture design which are required for the optimization of data.

Solution: The ability to migrate the IP address will help to allow the application services to migrate it to other hardware. One of the solutions can also be to add intelligence to the wired as well as Wi-Fi network connections. This, in turn, will help in optimizing the traffic, reduce costs and improve the services.

These problems do not pertain in most of the cases. There can be small problems but have been tackled well by the IT managers.

2. Brief about any four challenges that are faced while implementing IT infrastructure management.

The top 5 IT infrastructure management challenges & solutions:

1. Increasing complexity

While IT infrastructure has never been a simple topic, it would be hard to argue that the practice has not drastically changed over the last few decades. Indeed, modern IT infrastructure diagrams would be practically unrecognizable to IT managers of yesterday. The development of support systems such as Hubspot allows for more interactivity over a business network. However, they place a greater demand on it than 1st generation systems, which mostly facilitated one-way traffic.

Developing intelligent systems, such as chatbots, also poses severe obstacles to those unfamiliar with automation technologies or artificial intelligence. This is, in part, due to engineers being unfamiliar with automated systems, and also due to a lack of existing IT infrastructure to accommodate automated systems. For example, a network engineer at a retail enterprise might not want to adapt to intelligent

systems, or it might be the case that they may not have the technology to use them even if they wanted to.

The solution: Although network engineers often cite increased complexity as their major concern in modern IT infrastructures, automation minimizes the need for human intervention in network management. This frees up network engineers to handle larger tasks as the more granular work falls to automated processes. There is indeed a learning curve to these systems. However, the perks of built-in data scripting capabilities help maintain your uptime and keep administrators engaged in their work without getting bogged down by granular, routine tasks.

Similarly, IT systems with self-healing capabilities can automatically sense when they are not fully optimized and make necessary changes to repair themselves. Systems offering these capabilities may pose something of an initial challenge to administrators. Still, it's essential to recognize that they also provide far more benefits for that work.

2. Demand for more availability and security

As networks grow, so do the demands on that network. While older “spoke and hub” network models were relatively easy to maintain in terms of user need, modern networks require that engineers speed up deployment and shield networks from cyber threats. Over the last few years, the rise of remote work has placed an even greater demand on network administrators to provide more network options. This requires using an even larger perimeter of SaaS programs delivered via the cloud and third-party vendor solutions.

The solution: Infrastructure management solutions offer redundant virtual network functions (VNF) in the form of routers, firewalls, switches, and 5G backup for 24/7 availability, all while minimizing the endpoints that complicate remote networks.

More fundamental is the question of perception. Availability and security shouldn't be thought of simply as a problem and solution (i.e., tossing water on fire). Instead, it's important to think about the long term and choose security solutions to accommodate growth and drastic changes. This ensures that your infrastructure grows with you, offering a scalable solution for an enterprise of any size.

3. Lack Integration & vendor freedom

As the recent conversation around SASE and SSE has taught us, all-in-one solutions are rarely ever genuinely available. Most IT infrastructure is a conglomeration of different features and services provided by other vendors, each of which has its own software and interface used to manage them.

Without integrating these different vendor solutions according to the companies' needs, they often have to compromise on features, security, redundancy, etc.—making building a truly custom-fit network difficult. This inflated infrastructure can lead to feature overlap, where the same safety feature covered by multiple vendors causes authentication problems in a network's infrastructure.

The solution: Flexibility and agility are key here; enterprises need to adopt a network infrastructure that can accommodate their exact needs and adapt when those needs change. This requires a Linux-based solution that accommodates multi-vendor environments and 100% unique customization options. This unifies the IT infrastructure under a single umbrella and gives enterprises options to adjust their IT networks when necessary.

4. Multiple devices

IT managers working with an enterprise network have a massive variety of equipment to work with to make their networks function efficiently. This equipment might include, but is not limited to:

Servers, switches, and routers

Out of band hardware for remote users

Data Backup and configuration devices

Cellular failover boxes

With so much to keep track of, each new device is something more than an engineer needs to keep track of. This becomes even worse as end-of-life (EOL) solutions are replaced once a manufacturer deems them no longer useful. For example, the network for a national bank is naturally more work than a local bakery, even on the basis of how many devices a network engineer needs to keep track of.

The solution: The critical problem here is that networks with more devices have more points of failure. While it's often not realistic to limit the number of devices or pieces of hardware on a network, it is possible to use hardware solutions that bring those devices together under a single management UI. This unifies the data logging process and keeps your network functioning efficiently. Another solution comes in consolidated devices, which perform multiple duties usually operated by just one device. This reduces the space used on network servers and reduces energy costs associated with maintaining the network.

5. Legacy devices

As networks modernize, they quickly leave older devices behind. These "legacy devices" are outdated and incapable of integrating with modern software by themselves. As a result, they slow down workflow and pose significant security risks since security programs have difficulty protecting their data.

These devices pose a real problem for modern networks because, despite their inherent flaws, enterprises still insist on using them, citing staff familiarity and high replacement costs as reasons for keeping them around. For example, 53% of healthcare devices still operate on Windows 7, which Microsoft no longer supports. Unless those devices are updated, the data on those devices cannot be properly secured by modern networks.

The solution: Although legacy devices can't interact with modern network software on their own, it is possible to use specialized equipment to bring them into the IT network. The Nodegrid serial console, for example, allows administrators to monitor and secure legacy devices using a centralized user

interface. This can be used as a long-term solution if the company prefers; however, it can also be used while the company completely migrates the legacy data to a modern counterpart. This offers enterprises the best of both worlds—staff and business owners get to keep the most familiar systems. At the same time, network administrators can ensure that networks are kept as safe and efficient as possible.

3. "A design document contains eight types of information"-List them.

Process documentation. Process documentation includes all records of the software's development and maintenance. ...

- Planning documentation
- Estimate documentation
- Standards documentation
- Metrics documentation
- Scheduling documentation
- Product documentation
- System documentation

1. Process documentation

Process documentation includes all records of the software's development and maintenance. Developers create process documentation when they develop the initial concept and continue to add relevant information during each step of the process. This type of documentation keeps the developer's team informed, guides each team member through their role in the process and helps everyone involved accomplish the project's goals efficiently.

2. Planning documentation

A software development plan (SDP) outlines the developer's reason for pursuing the project and how they intend to create it. It also includes methods of development and gives team members an outline for monitoring the project as they work on it. Some factors an SDP addresses include:

Problems the software will solve
The development approach the team will use
The primary functions of the software
The order of development
Leadership roles for the project
Each team member's responsibilities

3. Estimate documentation

Before starting the project, software developers draft estimates to include in the process documentation. An estimate, also known as effort estimation, records the time or money the developer expects the process to require. Effort estimates help developers plan project budgets, choose teams and decide on pricing.

4. Standards documentation

Software standards are established norms, systems of rules or other formats used to create software. Open standards refer to those the public and other companies can access to create their own software. Closed standards describe formats and protocols the developer does not make available to others, such as patented processes. Developers document the software standards of their project so their team understands the objectives of the project and how to approach them.

5. Metrics documentation

Software metrics record the measurable aspects of the development process and the product. Product metrics include the size, complexity and quality of the software, while process metrics measure the efficiency of the techniques and tools teams use to develop software. Software metrics allow developers to:

- Compare different development methods
- Prepare quality specifications
- Measure the accuracy of effort estimations
- Give managers feedback throughout the development process

6. Scheduling documentation

Once a developer has organized a plan for their project, they use specialized software to make a detailed schedule for themselves and others on their team. The schedule includes tasks team members need to complete, deadlines for finishing them, the time the developer estimates each task will take and a list of resources for each team member, if available. Schedules play an important role in keeping everyone on the team on track throughout the development process.

7. Product documentation

Product documentation describes the software the development team plans to create and instructs on how to change and use it. Product documentation consists of two types, system documentation and user documentation. The development team uses system documentation, while end users benefit from user documentation. Both are important because they detail the components of the product and how users can apply them to solve a problem.

8. System documentation

System documentation outlines the components of the software and how they work together to produce it. It primarily benefits development team members by allowing them to track progress, modify specific elements and predict how the software will function. System documentation includes many aspects of the software, including:

- Capabilities
- Design
- Limitations
- Operation
- Maintenance

4.Explain Organizational Management Approaches ? Types of management approaches

Management plays a crucial role in the making of the organisation and therefore effective management is required to ensure every organisation is working towards a common objective or goal. Hence, it is essential to produce a good organisation structure and organisation relationship. The four different major types of management approaches will discuss in the following.

Classical Approach

Classical approach is mainly concentrate of the workers and organisations based on management practices, which were on outcome of careful observation. Classical approach mainly looks for economic efficiency with the universal principles of operation. (Abhijith 2011) In a management sense, classical approach is tried to develop and operate universal principles or models that will applied in all circumstances. Basically, this approach is looking for the best way which they believed can be exposed by the use of rational method.

According to Laurie J.Mullins (2005) also mentioned that the classical approach is encouraged the scientific view of the management and provide some common universal principles applicable to all organisation circumstances. Classical approach can be classified into three management includes scientific management, administrative management and bureaucratic management.

Scientific management

According to Taylor (1856-1915), scientific management was a theory of management that analysed the objective of increasing the labour productivity. Taylor also mentioned that management of business, industry or economy must be according to principles of efficiency from the experiments and operation in methods of work and production. Besides, Taylor also insisted that the manner of change in management could be determined by scientific study.

Bureaucracy Management

Bureaucracy is the name of an organisation used by organisation design professionals. Bureaucracy described a set of characteristics or attributes who deal with or who work with the organisations. In the 1930 Max Weber, a German sociologist described the bureaucracy as being a way of organising government agencies. (Gaurav 2011) The characteristics of bureaucracy management is based on the rational authority would be more adaptable to changes. (Abhijith 2011) Besides, system of written rules and standard operating procedures are prescribed to provide certainty and facilitate coordination. Impersonal relationship is maintained between the managers and employees. Moreover, only competence people are hiring for jobs based on their competence and technical qualifications.

Human Relation Approach

Human relation approach was emphasis on structure and the formal oraganisation, but the social factors at work and behaviour of workers within an organisation need to pay greater attention. This method

much more focused on the workmanships themselves and their satisfactory needs. They will ensured that the environment of their workplace provide a completely safety precautions. (Mullins 2007) This approach also worked on self-confidence of their workforce. (Patterson 1958) Besides, it also means people go to work to gain recognition, appreciation and not just simply for financial gains. Thus, managers should understanding the feelings and emotion of the workers and not treated them as machine.

Neo-Human Relation Approach

According to Laurie J.Mullins (2005), the neo-human relations are focus on the personal adjustment of individuals within the structure of the organization and effects of group relationships and leadership styles. It gave rise to several famous theories, including Maslow's Hierarchy of Needs, which suggests that workers are motivated to satisfy basic needs at five levels. Then, it also includes physiological, safety, love, esteem and self-actualization. This approach also includes Theory X and Theory Y. A project should therefore offer incentives to employees in order to fulfil and progress up the hierarchy. (Wan 2012) Attention shall be taken from the organisation structure, job satisfaction, communication, motivation and leadership styles.

System Approach

The characteristic about a system is the element from which it is built up. The term "built up" would indicate that a construction is somehow artificial and that is the meaning to be showing. A system also to be a whole composed of elements that are related to each other. (Wouter et al. 2002) It seeks to understand how they interact with one another and how they can be brought into proper relationship for the optimum solution of the problem. The systems approach relates the technology to the need, the social to the technological aspects. (Simon & Robin 1998) The interaction has two components which is input and output. Input is use to enters the system from the outside whereas for the output is use to leaves the system for the environment. In order to differentiate about the inside and outside of a system, the system itself and its environment shall be distinguished and separated by a boundary.

Contingency Approach

According to Mullins, L (2005), in the contingency approach there is no one best way of designing an organisation and structure management but should provide insights into that particular situation and circumstances which will affect the management decision. Besides, he stated that this approach has the view of 'if-then' relationship. "If certain situational factors exist, then certain variables in organisation structure and systems of management are most appropriate" (Mullins 2007, p.604) Contingency approach is an extension of the systems approach. There is no one optimum state. The most suitable structure and system of management is therefore dependent after the contingencies situation for each organization. The manager need try to identify which technique will be the best solution for a problem. Example is the problem of increasing productivity.

The Most Effectiveness Management Approach

Effectiveness is concerned with doing the correct things which is emphasis on outputs and the achievements required. Effectiveness management approach will deliver a good organisational structure and relationship through their situation or circumstances. By taking into consideration through the reviews and analysis of the different management approach, I found out that contingency approach is the most effective in promoting a good organisational structure and organisational relationships as compare to other management approach. This is because contingency approach has no one best design of organisation while it is a form of structure, management, and success of the organisation dependent upon a range of situational variables.

As we know that sometimes an organisation would come out the issue, argument, and conflict. To overcome the problem, contingency approach is the most effective to manage it because this approach is not seek to suggest a one best way to do the thing or manage the structure organisation but should provide some other situational and influences of management decisions. (Mullins 2007) Then, contingency approach seeks to apply the situations ideas drawn from various circumstances management. In classical approach, system approach and human relation approach all of this approach have their own managerial decision through the organisation structure and relationship whereas for this contingency approach it consider of no one approach is universally applicable and different problem and situations required different management styles. In order to achieve their goals or objective, contingency approach can be examine the relationship between the internal and external environment circumstances of an organisation.