System Architectures Outline ?Resource efficiency ?Network Virtualization Network virtualization uses software to create a "view" of the network that an administrator can use to manage the network from a single console. It abstracts hardware elements and functions (e.g., connections, switches, routers, etc.) ? Software-Defined Networking (SDN) virtualizes hardware that controls network traffic routing (called the "control plane") ?EA helps organizations to structure IT projects and policies to achieve desired business results, to stay agile and resilient in the face of rapid change, and to stay on top of industry trends and disruptions using architecture principles and practices, a process also known as enterprise architectural planning (EAP).The architectural components and set of relationships between these components that an architecture describes may consist of hardware, software, documentation, facilities, manual procedures, or roles played by organizations or people System Architectures Definition (Cont.) ?Virtualization uses software to create an abstraction layer over computer hardware that allows the hardware elements of a single computer-- processors, memory, storage and more--to be divided into multiple virtual computers, commonly called virtual machines (VMs).Central Processing Unit (CPU): is the part of the computer that is built to be obsessed with "what is next?" . o What is next means what instructions should I perform next. o CPU performs insurrections that already stored in the main memory. ? Main Memory: is used to store information that the CPU needs in a hurry. o The main memory is nearly as fast as the CPU. o The information stored in the main memory vanishes when the computer is turned off. Hardware Architecture (Cont.) ? Secondary Memory is also used to store information, but it is much slower comparing to the main memory. The advantage of the secondary memory is that it can store information even when the power is off "Permanent".Software Architecture (Cont.) o The data layer returns the information to the processing layer which in turn sends it to the interface where you can view and edit it. o While it feels like one cohesive process, it's broken down into three (or more) components on three distinct layers.There are two types of desktop virtualization: o Virtual desktop infrastructure (VDI) runs multiple desktops in VMs on a central server and streams them to users who log in on thin client devices.Benefits of System Architectures o Vision Development and implementation o Facilitate Faster IT System Changes o Ensure that the IT plans align with business programs o Analyze potential cost-saving opportunities Virtualization Outline ?Enterprise architecture (EA) is the practice of analyzing, designing, planning, and implementing enterprise analysis to successfully execute on business strategies.Type2 run as an application on an existing OS. Most commonly used on endpoint devices to run alternative operating systems, they carry a performance overhead because they must use the host OS to access and coordinate the underlying hardware resources.o Local desktop virtualization runs a hypervisor on a local computer, enabling the user to run one or more additional OSs on that computer and switch from one OS to another as needed without changing anything about the primary OS. Types of virtualization (Cont.) ?Network Function Virtualization (NFV) virtualizes one or more hardware appliances that provide a specific network function (e.g., a firewall, load balancer, or traffic analyzer), making those appliances easier to configure, provision, and manage.It's a representation of a system in which there is a mapping of functionality onto hardware and software components, a mapping of the software architecture onto the hardware architecture, and human interaction with these components.Hardware Architecture refers to the identification of the physical components and their

interrelationships, which allows hardware designers to understand how their components fit into a system architecture.There are many architecture styles which can be applied on software, such as; o Layered architecture o Publish–Subscribe architecture Software Architecture (Cont.) ?Publish–Subscribe architecture or Pub/Sub is a messaging service where the senders of messages are decoupled from the receivers of messages.o Subscriber (also called a consumer): receives messages on a specified subscription Software Architecture (Cont.) ?It is especially useful for large businesses going through digital transformation, because it focuses on bringing legacy processes and applications together to form a more seamless environment.This has become a priority for businesses that are trying to keep up with new technologies such as the cloud, IoT, machine learning, and other emerging trends that will prompt digital transformation.Storage Virtualization Storage virtualization enables all the storage devices on the network, whether they're installed on individual servers or standalone storage units to be accessed and managed as a single storage device.Application Virtualization runs application software without installing it directly on the user's OS. This differs from complete desktop virtualization because only the application runs in a virtual environment, while the OS on the end user's device runs as usual.Architecture can function as a guide or a framework for designing and developing a new system or can assist in defining a project's goals.It shows the connections between the various components of the system and indicates what functions each component performs.It normally comprise several files containing the VM's configuration, the storage for the virtual hard drive, and some snapshots of the VM that preserve its state at a particular point in time.I/O Devices are simply our screen, keyboard, mouse, microphone, speaker, touchpad, etc.Hardware Architecture (Cont.) Software Architecture ??????????????2.3.???????????