

Introduction to System Integration and Architecture

System Integration

- **Definition:**

- System integration is the process of combining different subsystems or components into a larger system that functions as a whole.

- **Purpose:**

- It aims to ensure that all the individual parts work together seamlessly, enabling the overall system to achieve its intended goals.

- **Key Aspects:**

- **Connecting disparate systems:** Integrating systems with different interfaces and technologies.
 - **Ensuring data consistency:** Maintaining the integrity and accuracy of data across integrated systems.
 - **Establishing communication channels:** Creating pathways for data exchange and interaction between systems.
 - **Managing complexity:** Addressing the challenges of integrating numerous components and their interactions.

System Architecture

- **Definition:**

- System architecture is the conceptual model that defines the structure, behavior, and interactions of a system's components.

- **Purpose:**

- It provides a blueprint for designing, developing, and deploying a system, ensuring that it meets the required functionality and performance.

- **Key Aspects:**

- **Defining system structure:** Specifying how the system is organized and how its components relate to each other.
- **Describing system behavior:** Outlining how the system will operate and respond to different inputs and conditions.
- **Establishing interfaces:** Defining how different components will interact and exchange information.
- **Guiding development:** Providing a framework for building and deploying the system.

Relationship

- System integration relies on the principles and guidelines established by the system architecture.
- The architecture provides the blueprint for how the system should be built, while integration is the process of actually assembling and connecting the components according to that plan.
- A well-defined system architecture can simplify the integration process by providing clear guidelines for component interaction and data exchange.
- Architecture defines the **structure**, while integration ensures **communication** between components and systems.

Definition

- ***System integration and architecture are two interconnected concepts crucial for creating functional and efficient systems.***
- ***System integration is the process of linking together different computing systems and software applications to act as a coordinated whole.***

Example:

- Imagine building a house (the system).
 - The architectural design (system architecture) would include blueprints specifying the layout of rooms, the materials to be used, and how the electrical and plumbing systems will be connected.
 - System integration would then involve actually constructing the house by bringing together all the different components (walls, roof, wiring, plumbing) according to the architectural plans.

- Automotive
 - Connected Cars
 - Data from GPS, sensors, cameras integrated into a central system
Architecture supports real-time decisions for autopilot
- Healthcare
 - Electronic Health Records (EHR)
 - Integration of labs, prescriptions, and patient histories
- E-Commerce
 - Amazon/Lazada/Shopee
 - Systems integrated for inventory, payments, shipping, and analytics

Role of System Architect



What is a system architect?

- ❑ A system architect is in charge of:
 - ❑ Devising
 - ❑ Configuring
 - ❑ Operating
 - ❑ Maintaining both computer and networking systems



What is a system architect?

- ❑ They objectively analyze desired processes and outcomes and advise on the right combination of IT systems and components to achieve specific business, department, team, or functional goals



System architects must be highly proficient in understanding:

- ⬡ How much stress computer systems can take.
- ⬡ How they need to be used.
- ⬡ What is needed for the system designs to hold up.

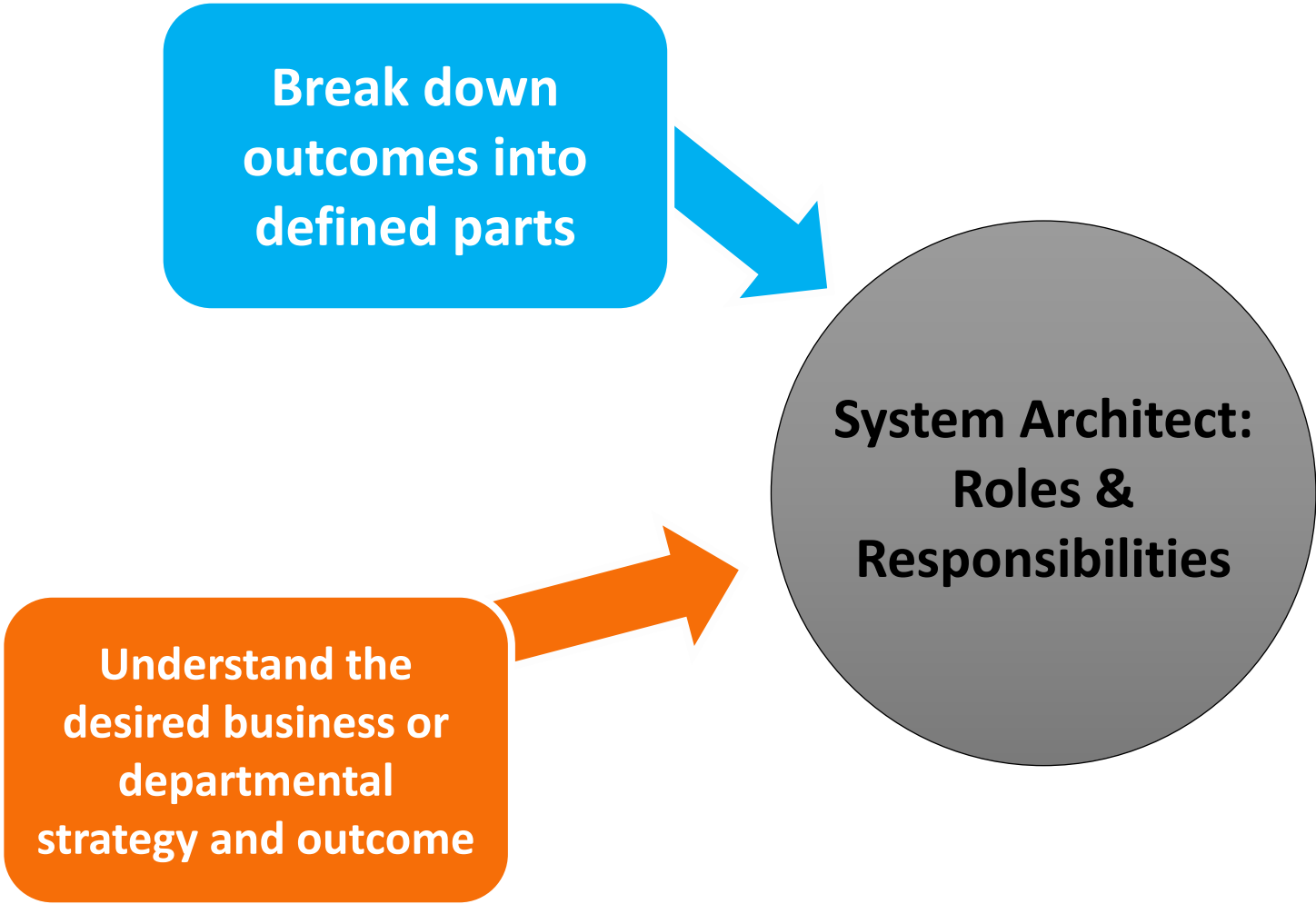
Levels of system architects

- ⬡ Highest level
- ⬡ Medium level
- ⬡ Lowest level



- ◊ System architects are business and technology experts.
- ◊ They look at business plans and goals, analyze technical solutions, and create recommendations on the right mix of IT elements to achieve those objectives.

**Break down
outcomes into
defined parts**

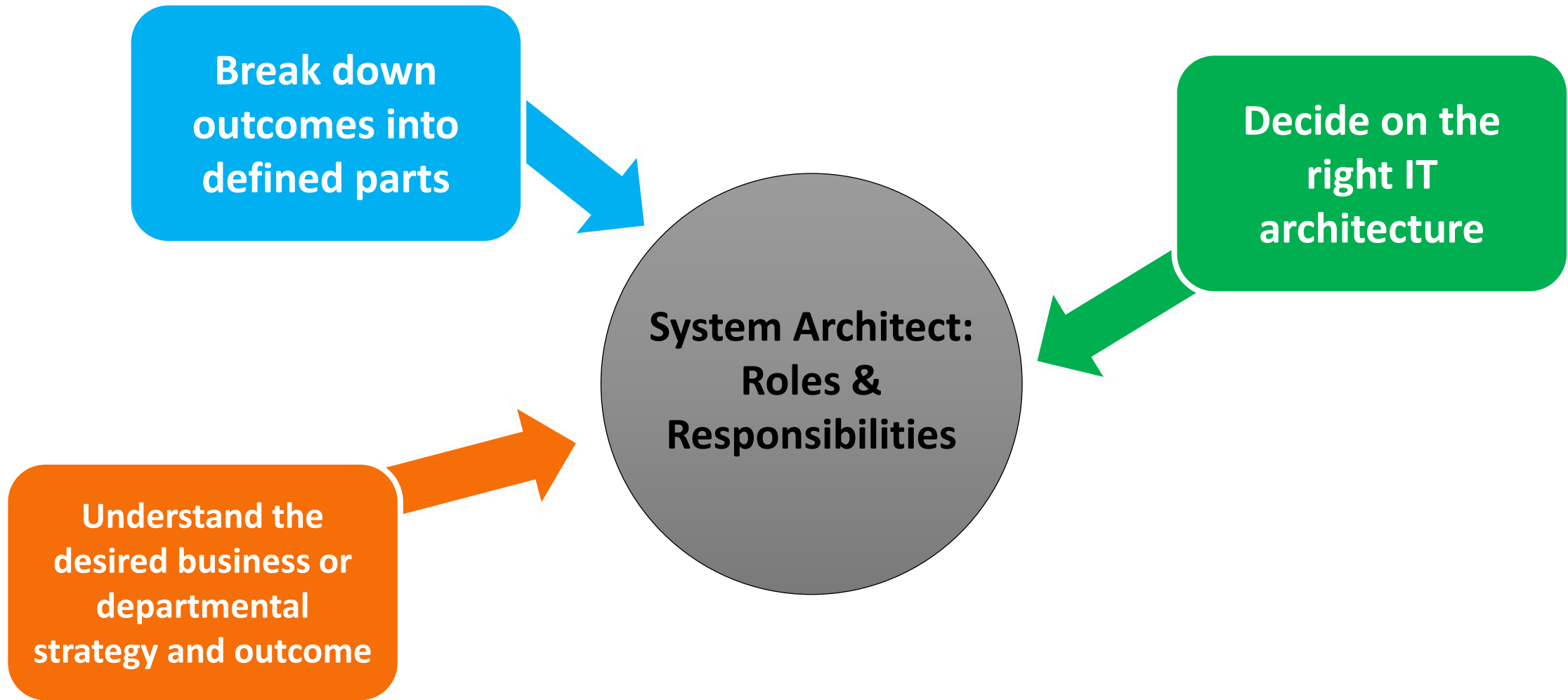


**Understand the
desired business or
departmental
strategy and outcome**

**System Architect:
Roles &
Responsibilities**

Documentation may include:

- ⬡ The name, purpose, and outcome of the initiative
- ⬡ The main features, functionality, and processes for the initiative
- ⬡ Overall IT methodology and frameworks impacting the initiative
- ⬡ Key existing infrastructure and applications
- ⬡ New staffing or resource requirements
- ⬡ Ideas for potential software and hardware solutions

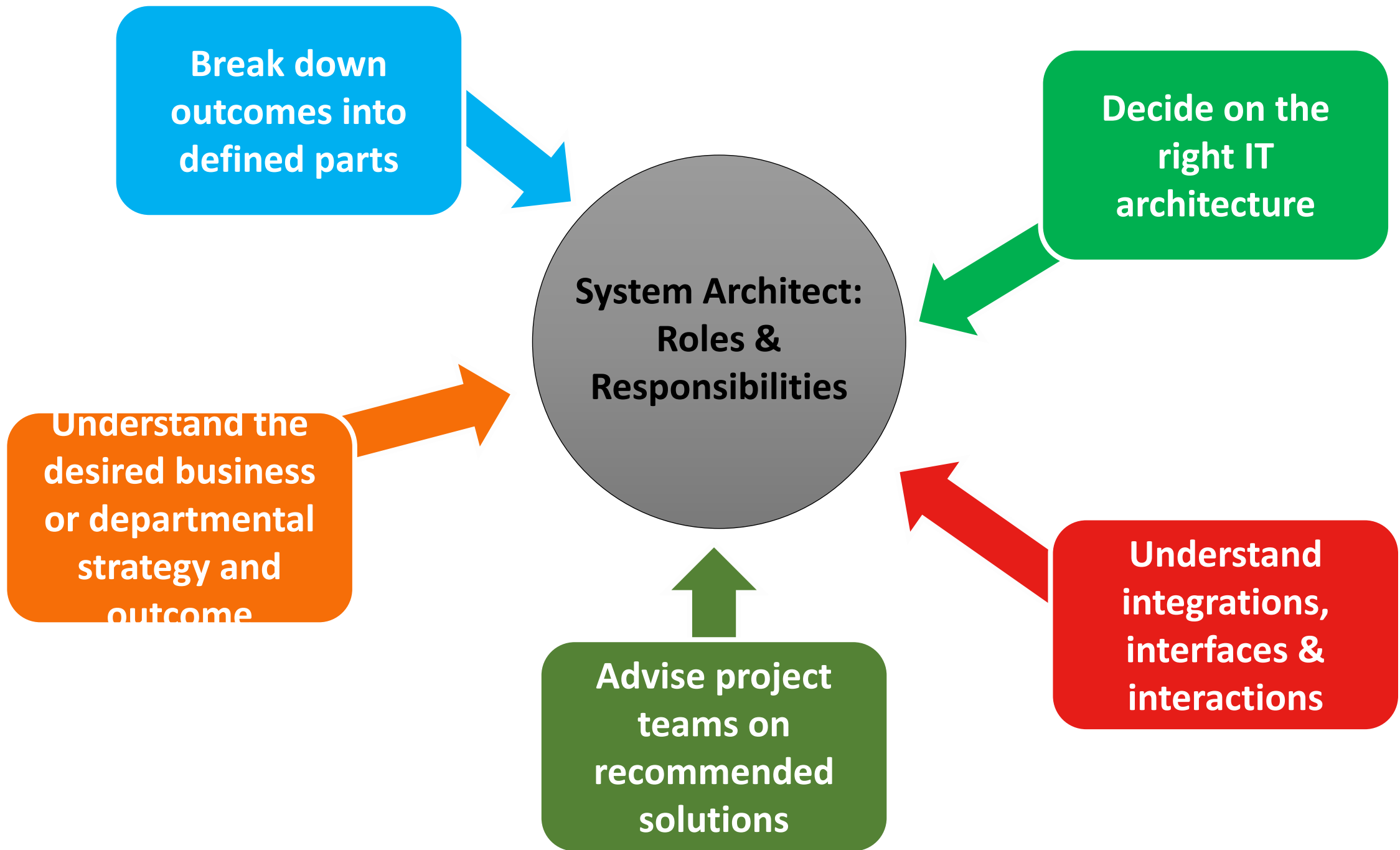


A system architect takes the following areas into account:

- ⬡ Alignment with over all goals
- ⬡ Specific business requirements
- ⬡ The existing IT ecosystem
- ⬡ New and established technologies
- ⬡ IT resources and staffing
- ⬡ Cost control and return on investment

A system architect takes the following areas into account:

- ⬡ End user and customer needs and experience
- ⬡ Availability, responsiveness, reliability, and resilience of critical elements
- ⬡ Alignment with architecture standards and best practice
- ⬡ IT service management and support



Systems architect skills

- ⬡ Experience with computer servers, network switches, load balancers, network analyzers, and network channel or data service units
- ⬡ Knowledge of developing strategic system architecture plans
- ⬡ Solid understanding of network and system development and deployment
- ⬡ Strong analytical, problem-solving, and conceptual abilities

Systems architect skills

- ⬡ Excellent verbal and written communication skills
- ⬡ Experience with information processing fundamentals and best practices
- ⬡ Ability to prioritize tasks, especially when under pressure
- ⬡ Above-average leadership and collaboration abilities

The system architect role is vital to the successful definition, design, delivery, and support of any IT project.

Whether an organization is looking to create new systems, or is in the process of strengthening and growing already existing ones, having a qualified system architect on the team will make all the difference.

Thank You!

