# Introduction

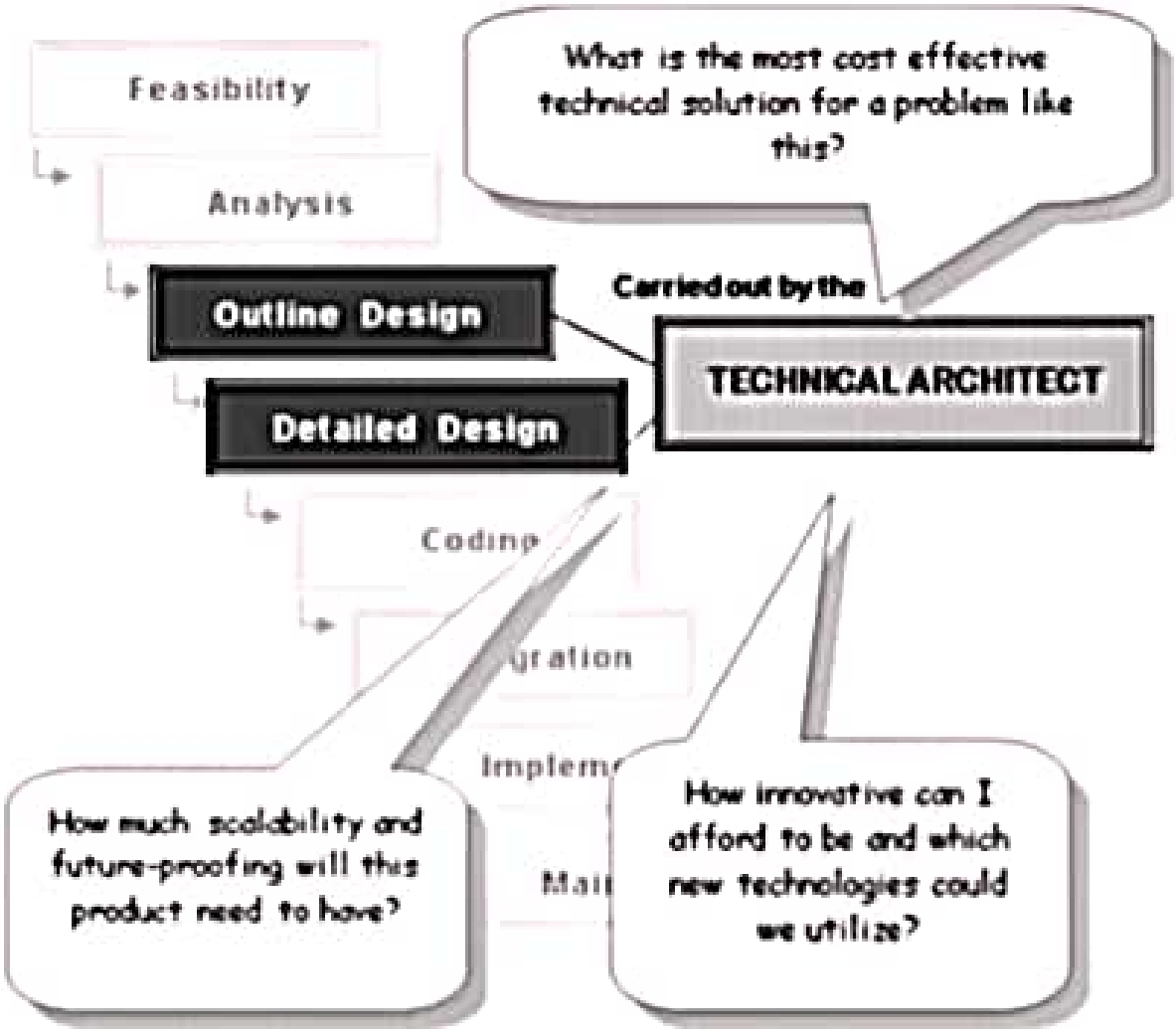
Technical Architects are considered to be the intellectual giants of IT. These people come on board because the tried and tested approach simply won't work anymore. When we need to get creative with IT, when we have wandered unsteadily into a new and uncharted IT terrain, we look for a TA to help us out of the predicament.

The role of a TA is much more about being innovative with IT, be it in relation to software, hardware or infrastructure problems. Constantly pushing IT to new levels, these are the individuals who will find a way to overcome the immense technical hurdles which arise in today's demanding corporate IT environment.

# The Role in Detail

## The TA in the Project Lifecycle

The diagram below showsat which stage the TA makes an appearance in the project lifecycle, and the questions they usually need to ask:



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Public Infrastructure as a Service providers commonly offer virtual servers containing one or more CPUs, running several choices of operating systems and a customized software stack. In addition, storage space and communication facilities are often provided.

IaaS provides virtual machines, virtual storage, virtual infrastructure, and other hardware assets as resources that clients can provision. The IaaS service provider manages all the infrastructure, while the client is responsible for all other aspects of the deployment. This can include the operating system, applications, and user interactions with the system.

Examples of IaaS service providers include:

- Amazon Elastic Compute Cloud (EC2)
- Eucalyptus
- GoGrid
- FlexiScale
- Linode
- RackSpace Cloud
- Terremark

**Features**

In spite of being based on a common set of features, IaaS offerings can be distinguished by the availability of specialized features that influence the cost—benefit ratio to be experienced by user applications when moved to the cloud. The most relevant features are: (i) geographic distribution of data centers; (ii) variety of user interfaces and APIs to access the system; (iii) specialized components and services that aid particular applications (e.g., load- balancers, firewalls); (iv) choice of virtualization platform and operating systems; and (v) different billing methods and period (e.g., prepaid vs. post-paid, hourly vs. Monthly).

***Geographic Presence.*** To improve availability and responsiveness, a provider of worldwide services would typically build several data centers distributed around the world. For example, Amazon Web Services presents the concept of "availability zones" and "regions" for its EC2 service. Availability zones are "distinct locations that are engineered to be insulated from failures in other availability zones and provide inexpensive, low-latency network connectivity to other availability zones in the same region." Regions, in turn, "are geographically dispersed and will be in separate geographic areas or countries."

***User Interfaces and Access to Servers.*** Ideally, a public IaaS provider must provide multiple access means to its cloud, thus catering for various users and their preferences. Different types of user interfaces (UI) provide different levels of abstraction, the most common being graphical user interfaces (GUI), command-line tools (CLI), and Web service (WS) APIs. GUIs are preferred by end users who need to launch, customize, and monitor a few virtual servers and do not necessary need to repeat the process several times. On the other hand, CLIs offer more flexibility and the possibility of automating repetitive tasks via scripts (e.g., start and shutdown a number of virtual servers at regular intervals). WS APIs offer programmatic access to a cloud using standard HTTP

requests, thus allowing complex services to be built on top of IaaS clouds.

***Advance Reservation of Capacity.*** Advance reservations allow users to request for an IaaS provider to reserve resources for a specific time frame in the future, thus ensuring that cloud resources will be available at that time. However, most clouds only support best-effort requests; that is, users requests are server whenever resources are available.

Amazon Reserved Instances is a form of advance reservation of capacity, allowing users to pay a fixed amount of money in advance to guarantee resource availability at anytime during an agreed period and then paying a discounted hourly rate when resources are in use. However, only long periods of 1 to 3 years are offered; therefore, users cannot express their reservations in finer granularities—for example, hours or days.

***Automatic Scaling and Load Balancing:*** As mentioned earlier in this chapter, elasticity is a key characteristic of the cloud computing model. Applications often need to scale up and down to meet varying load conditions. Automatic scaling is a highly desirable feature of IaaS clouds. It allow users to set conditions for when they want their applications to scale up and down, based on application-specific metrics such as transactions per second, number of simultaneous users, request latency, and so forth.

When the number of virtual servers is increased by automatic scaling, incoming traffic must be automatically distributed among the available servers. This activity enables applications to promptly respond to traffic increase while also achieving greater fault tolerance.

***Service-Level Agreement.*** Service-level agreements (SLAs) are offered by IaaS providers to express their commitment to delivery of a certain QoS. To customers it serves as a warranty. An SLA usually include availability and performance guarantees. Additionally, metrics must be agreed upon by all parties as well as penalties for violating these expectations.

Most IaaS providers focus their SLA terms on availability guarantees, specifying the minimum

**Cloud Computing Deployment Model**

This is a new model concept that can be divided into the following four famous models (but there might be other models that can be drawn from them)

**•Public:**
Services and resources are reachable to the public by using the internet. This environment emphasises the advantages of rationalization (as a user has the ability to utilize only the needed services and pay only for their use), operational simplicity (as the system is organized and hosted by a third party) and scalability. The main concern in this type of cloud environment is the security; since this environment is accessible to the public and user data in one stage is hosted by a third party.

**•Private:**
Services and resources are reachable within a private institute. This environment emphasises the advantages of integration, optimization of hardware deals and scalability. The main concern is the complexity, as this environment is organized and hosted by internal resources. Security is not a main issue compared to the public cloud as the services are reachable only through private and internal networks.

**•Community:**
Services and resources of this type are shared by various institutes with a common aim. It may be organized by one of the institutes or a third party

**•Hybrid:**
This type combines the methods from the private and public clouds, where resources can be used either in a public or a private cloud environment. The advantages and the concerns are a mixture of the earlier type. Another cloud technology which has become very popular recently is called Green Cloud Computing. Its aim is to reduce resource consumption and yet fulfil qu ality of service needed and hold the resources switched off as long as possible. "The advantages of such technology are lower heat production and power saving by employing server consolidation and virtualization technologies; since active resources (servers, network elements, and A/C units) that are idle lead to energy waste"

## Interviewing Technical Architects

On the CVs of TAs we should see a range of projects that were rescued from disarray and brought into harmony using many of the technologies and concepts.

Ask them to explain where in their CVs the client might see evidence of the following:

- An emphasis on designing solutions; be they for infrastructure problems, development challenges or web architecture.
- Details of how they overcame key challenges within systems integration and systems planning projects.
- Exposure to technical challenges which came about as a result of corporate mergers or large scale migrations.
- An indication of the level of interaction which they had with their previous IT Directors, and to what extent they influenced IT strategy in their last few roles.
- Focus on certain key skills geared towards the bigger problems such as the development of high-end software solutions (also in web infrastructure situations), deployment of middleware solutions, and implementing EAI and systems integration solutions.

On the whole, the TA should have enough gravitas, confidence and ability to demonstrate their experience in aligning the IT strategy to the greater business strategy of an organisation.

## What is Requirements Determination?

A requirement is a vital feature of a new system which may include processing or capturing of data, controlling the activities of business, producing information and supporting the management.

Requirements determination involves studying the existing system and gathering details to find out what are the requirements, how it works, and where improvements should be made.

## Major Activities in requirement Determination

### Requirements Anticipation

- It predicts the characteristics of system based on previous experience which include certain problems or features and requirements for a new system.
- It can lead to analysis of areas that would otherwise go unnoticed by inexperienced analyst. But if shortcuts are taken and bias is introduced in conducting the investigation, then requirement Anticipation can be half-baked.

### Requirements Investigation

- It is studying the current system and documenting its features for further analysis.
- It is at the heart of system analysis where analyst documenting and describing system features using fact-finding techniques, prototyping, and computer assisted tools.

### Requirements Specifications

- It includes the analysis of data which determine the requirement specification, description of features for new system, and specifying what information requirements will be provided.

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- It includes analysis of factual data, identification of essential requirements, and selection of Requirement-fulfillment strategies.

### Fact Finding Techniques

To study any system the analyst needs to do collect facts and all relevant information. the facts when expressed in quantitative form are termed as data. The success of any project is depended upon the accuracy of available data. Accurate information can be collected with help of certain methods/ techniques. These specific methods for finding information of the system are termed as fact finding techniques. Interview, Questionnaire, Record View and Observations are the different fact finding techniques used by the analyst. The analyst may use more than one technique for investigation.

**Interview**

This method is used to collect the information from groups or individuals. Analyst selects the people who are related with the system for the interview. In this method the analyst sits face to face with the people and records their responses. The interviewer must plan in advance the type of questions he/ she is going to ask and should be ready to answer any type of question. He should also choose a suitable place and time which will be comfortable for the respondent.

The information collected is quite accurate and reliable as the interviewer can clear and cross check the doubts there itself. This method also helps gap the areas of misunderstandings and help to discuss about the future problems. Structured and unstructured are the two sub categories of Interview. Structured interview is more formal interview where fixed questions are asked and specific information is collected whereas unstructured interview is more or less like a casual conversation where in-depth areas topics are covered and other information apart from the topic may also be obtained.

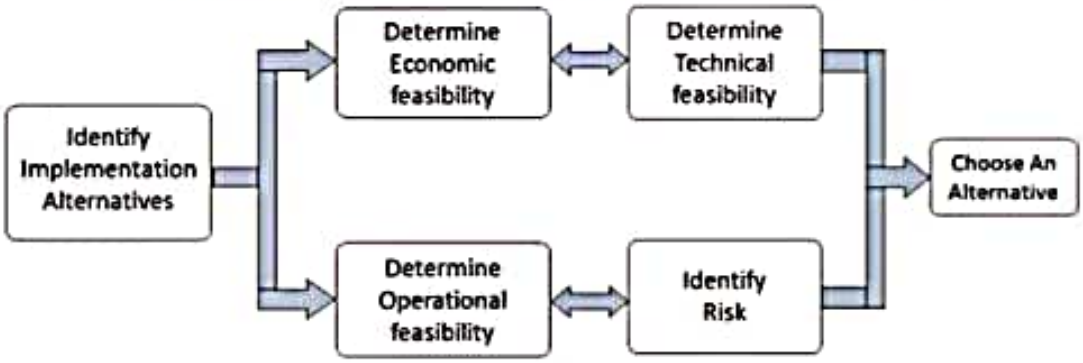
## Steps Involved in Feasibility Analysis

The following steps are to be followed while performing feasibility analysis −

- Form a project team and appoint a project leader.
- Develop system flowcharts.
- Identify the deficiencies of current system and set goals.

[redacted]

- Enumerate the alternative solution or potential candidate system to meet goals.
- Determine the feasibility of each alternative such as technical feasibility, operational feasibility, etc.
- Weight the performance and cost effectiveness of each candidate system.
- Rank the other alternatives and select the best candidate system.
- Prepare a system proposal of final project directive to management for approval.




## Types of Feasibilities

### Economic Feasibility

- It is evaluating the effectiveness of candidate system by using cost/benefit analysis method.
- It demonstrates the net benefit from the candidate system in terms of benefits and costs to the organization.
- The main aim of Economic Feasibility Analysis (EFS) is to estimate the economic requirements of candidate system before investments funds are committed to proposal.
- It prefers the alternative which will maximize the net worth of organization by earliest and highest return of funds along with lowest level of risk involved in developing the candidate system.

### Technical Feasibility

- It investigates the technical feasibility of each implementation alternative.
- It analyzes and determines whether the solution can be supported by existing technology or not.
- The analyst determines whether current technical resources be upgraded or added it that fulfill the new requirements.
- It ensures that the candidate system provides appropriate responses to what extent it can support the technical enhancement.