Chapter 1

# 1.1

1. The basic goal of network design is to interconnect various software and hardware devices so that resources can be shared and distributed.

2. Network design is a very complex task that involves a multitude of managerial and technical considerations.

3. In some organizations, expenses associated with the network are viewed as “overhead”.

This view can lead to the perspective that anything but the most basic expenditures on the network are superfluous to the primary business.

4. An informal, reactive network planning process is often associated with frequent downtime why?

Because the network can be dismantled or changed on a whim, without regard to how the changes might impact the people using it.

So, there is an opportunity cost associated with the lost staff productivity resulting from the network downtime.

There is also an opportunity cost associated with lost productivity resulting from the diversion of staff from their primary job functions to support the network.

When changes to the network are not carefully planned and implemented, it compounds the difficulty of maintaining the network in a cost-effective way.

5. A systems approach is essential to ensuring a comprehensive assessment of critical network requirements.

A system approach means that the requirements are considered from a global perspective that encompasses both top-down and bottom-up views.

The business perspective is top-down, big-picture of how the design will impact the organization.

The technical perspective is a bottom-up, narrowly focused view concentrating on essential design details.

# Define the Business Objectives

1.Defining the business objectives is a vital first step in the network planning process.

A logical start to the top-down analysis ----define the business objectives served by the network.

The business objectives should relate to the strategic focus of the organization.

The objectives will also help determine the type of network needed and the level of expenditure and the level of expenditure and support that is appropriate.

Business objectives have many impacts on technical decisions regarding the selection of technology, the performance requirements, and required resource commitments.

2. Many business objectives relate to gaining and maintaining competitive advantage. Four basic strategies to sustain competitive advantage are:

* Low-cost leadership
* Focus on market niche
* Products and service differentiation
* Strategic alliance and linkages with partners

3. Interland

* Believe there is a vast market potential for software tools to create an online presence for the 20 million businesses in the US with fewer than ten employees.
* Provides a basic service includes a Web site and 30 e-mail-message accounts.
* Offers hundreds of design templates(模板) and the ability to add and edit pictures and publish and update text without professional knowledges so that small companies can easily develop.

4. Amazon.com

* being an exclusively online retailer that holds very little inventory. (low-cost leadership)
* Outsources(外包) almost all of its operations, except for information technology. (low-cost leadership)
* Use customer relationship management(CRM) technology to collect and analyze customer buying habits and preferences.
* use customer preference information it collects to effectively target market niches and to make tailored product recommendations to customers when they return to the site.
* Expands the breadth and depth of its product offerings through strategic alliances and partnerships with various providers.

5. Other business objectives

* Compliance with legislation and regulatory requirements that may mandate fundamental business process changes
* Improved outreach and accessibility (更好的宣传和可及性)
* Enhanced marketing efforts to reach new customers and to reduce attrition and churn of existing customers.(加大营销力度以获得更多顾客并且减少现有顾客的流失)

6. Organization should evaluate these to understand the impact of the business objectives.

* Current processes and business practices(当前进程和业务实践)
* Changes required in current processes and business practices to achieve the desired business objectives.
* Process, resource, technology, staffing, and organizational requirements for successful implementation

7.how to generate more potential business objectives?

Meetings and idea-generating sessions with decision makers, planners, and other key players can generate a lot of potential business objectives.

8. If the list is long, the “80/20” or Pareto rule can be used to reduce it down to a manageable size.

This rule is used to focus on important concerns and to avoid distraction by trivial(琐碎) or overly difficult（过于困难） ones.

9. Apply the 80/20 rule

* First, identify business objectives that are redundant or similar, so they can be summarized.
* Objectives that, upon further reflection, appear unimportant should be dropped.(经过进一步思考后不重要的目标应该被排除)
* Each business objective should be evaluated with respect to its potential value and difficulty.
* The surviving business objectives should be carefully evaluated with respect to risk factors, required effort and the availability of time and resources.

10. Scoring process should not be applied too stringently ?

* The scoring process may obscure some of the subtleties in the selection process.(计分可能会掩盖一些细微之处)
* Scoring should be used as a gross filter, not a fine one.
* The human element and common sense should prevail（占上风） during the decision-making process.(在决策中应该以人为因素和常识为准)
* The intent(意图) is to engage the appropriate stakeholders in （make someone take part in ）discussion and to achieve consensus(达成共识) on the organizational focus.

1.1.2 Determine Potential Risks, Dependencies, Costs, and Benefits

1. the feasibility of the project should be considered relative to a number of risk factors:

* Technology-related risk factors:
  + the use of new and emerging technologies
  + limitation in the technology relative to its intended use.
* Personnel or labor risk factors:
  + the organization’s experience with similar projects
  + the degree of organizational support and commitment to the network project
* Security risk factors:
  + Vulnerability to unauthorized outside intrusion
  + Vulnerability to inappropriate use of corporate resources by “authorized” system users
* Financial risk factors:
  + Tangible(有形) financial impacts resulting from lost profits, budget changes due to project or network failure
  + Intangible impacts resulting from loss of customer goodwill（信誉），industry perceptions due to project or network failure.
* Disaster risk factor
* Legislation, regulatory, and liability risk factors
  + Legislation that may either create or eliminate markets and avenues for competition
  + New regulatory requirements that may force major business process and infrastructure changes to ensure the compliance required for continued operation.

2. Use fewer vendors

sign multi-year contracts

consolidate vendor contracts to get high-volume discounts

get instant ROI

easier to manage and minimizes risk

but lose flexibility or opportunities to embrace new technology

3. Many companies are considering using the Internet for their network infrastructure.

* Because IP/VPNs can cut corporate network costs as much as 30 to 40 percent.
* Older Frame Relay and ATM networks are based on private, dedicated lines over which the company has complete end-to-end control.
* If the public internet is used to transport confidential and sensitive company data, additional measures are usually needed to provide adequate protection against security breaches and loss or corruption of critical data.
* Which means if companies are going to save 30 percent by using a VPN, they should spend at least another 5 percent for additional security.

4. Return on investment (ROI) is a powerful, nearly universal, and well-understood metric to help justify new initiatives to demonstrate how they will make money, save money, or save time.

# Identify Project Requirements

1.It is not easy to collect the information needed to perform a complete requirements analysis

* The main reason the data collection is time-consuming, and complex relates to the fact that the data needed is often not available or is not in the form needed for analysis.
* Considerable effort is usually required to estimate and derive the real parameters needed to design the network.

2. the report should include:

* Management summary
* Project requirement-functional requirements
* Performance requirement
* Specialized application and software requirements
* Potential growth, expansion and scalability requirements
* Distance and geographic requirements
* Backup and redundancy requirements
* Partial list of supporting documentation

# Develop project implementation approach

1.Method of dealing with risk

* Create and implementation plan that is evolutionary
* Specify how existing systems are to coexist or be transformed to operate in the new network environment
* Pilot projects may be helpful in evaluating various network options
* Business processes affected by the network implementation should be examined and those needing refinement should be identified

1.2 Strategic Positioning Using Networks

1. Summing up, Microsoft has **devised a multi-pronged strategy** to make its Windows platform ever more compelling, ***fully integrated, and functional in supporting end-user voice, video, chat, e-mail, and software applications***, thereby ensuring that it will remain a dominant player in the market.

# Calculation of Technology’s Strategic Value

1. The Adoption-Diffusion Model

* Estimate profits to be gained by using the new technology in the initial stages
* Forecast the time period over which the product or service will be commoditized as competitors and conservative and late adopters enter the market to drive down prices.
* Compute expected decreases in profit flows as the product or service becomes a commodity
* Calculate the total discounted cash flow based on the forecasted life cycle of the product, service or project.
  1. Dealing with Major Design Challenges

# 1.3.1 Organizational Concerns and Recommendations

1.3.1.1 Senior management involvement and support

Why?

The ability to successfully lead these initiatives requires an entrepreneurial spirit and a thorough understanding of the market and the company’s operation.

Senior management must also be able to clearly communicate business objectives so that bottom-line requirements can be factored into the planning and execution of the network strategy.

Senior management has a pervasive effect on organizational culture and serves as an invaluable role model to encourage others.

1.3.1.2 Recruiting, Training, and Maintaining Skilled Staff

1. organization should

* Hire, train and retain skilled managers and staff who understand technology and how it can be used to satisfy organizational objectives.
* some employees may push to implement a new technology because it is perceived as a better path for personal growth than other, perhaps more appropriate but older or mundane options
* May be a need to adopt new technologies that current stuff members are not willing to embrace because they are resistant to change

1.3.1.3 Effective Program and Project Management

Once a project has started, **reporting mechanisms should be in place** to track progress against milestones, budget allocations and projected ROI.

Projects that achieve targeted outcomes should **receive continued funding and management sponsorship**

Projects that are failing should be cut short

During the planning process, potentially serious political and organizational issues should also be identified.

# 1.3.2Technology Concerns and Recommendations

1.3.2.1 Keeping Abreast of New Developments(与时俱进)

1. using multiple vendors can pose problems, particularly when there are

problems with the network implementation and each vendor is pointing

a finger at the other

2. a particular network vendor will provide only part of the network solution, it is

incumbent upon the network design team to make sure that the overall

network requirements are addressed

1.3.2.2 Maintaining a Secure Networking Environment

1.CSO responsibilities include:

* Identifying security goals and objectives consistent with corporate strategy
* Overseeing the protection of tangible assets, intellectual property, computer systems, networking infrastructure, and people
* Managing security policy, standards, guidelines, and procedures to ensure ongoing security maintenance
* Establishing relationships with local, state, government, and federal law enforcement agencies, as appropriate.
* Overseeing investigation of security breaches and organizational response to ensure appropriate disciplinary, legal and corrective actions.

2.CISSP certification involves:

* Access control systems and methodology
* Applications and systems development
* Business continuity planning
* Cryptography
* Law, investigation and ethics
* Operations security
* Physical security
* Security architecture and models
* Security management practices
* Telecommunications, network and internet security

3.GAISP based on three sets of principles:

* Pervasive principles(普遍性原则)
* Broad functional principle(广泛功能原则)
* Detailed principle

1.3.2.3 Managing Complexity

1. the key to managing complexity is to simplify wherever possible

* Select protocols and equipment based on ease of use and manageability
* Use plug-and-play components wherever possible
* Transition from proprietary to open standards
* Use client/server and object-oriented application development methodologies to promote code reusability and modularity
* Integrate voice, data, and video on single IP platform
* Automate data center and network management tasks
* Utilize middleware to provide network and application control based on predefined business rules