CH2. The Origins of Software

- 說明 outsourcing.

- 描述 six different sources of software.

  - IT services firms
  - Packaged software producers
  - Enterprise-wide solutions
  - Cloud computing
  - Open source software
  - In-house developers

- 討論如何評估 off-the-shelf software.

- Explain reuse and its role in software development.

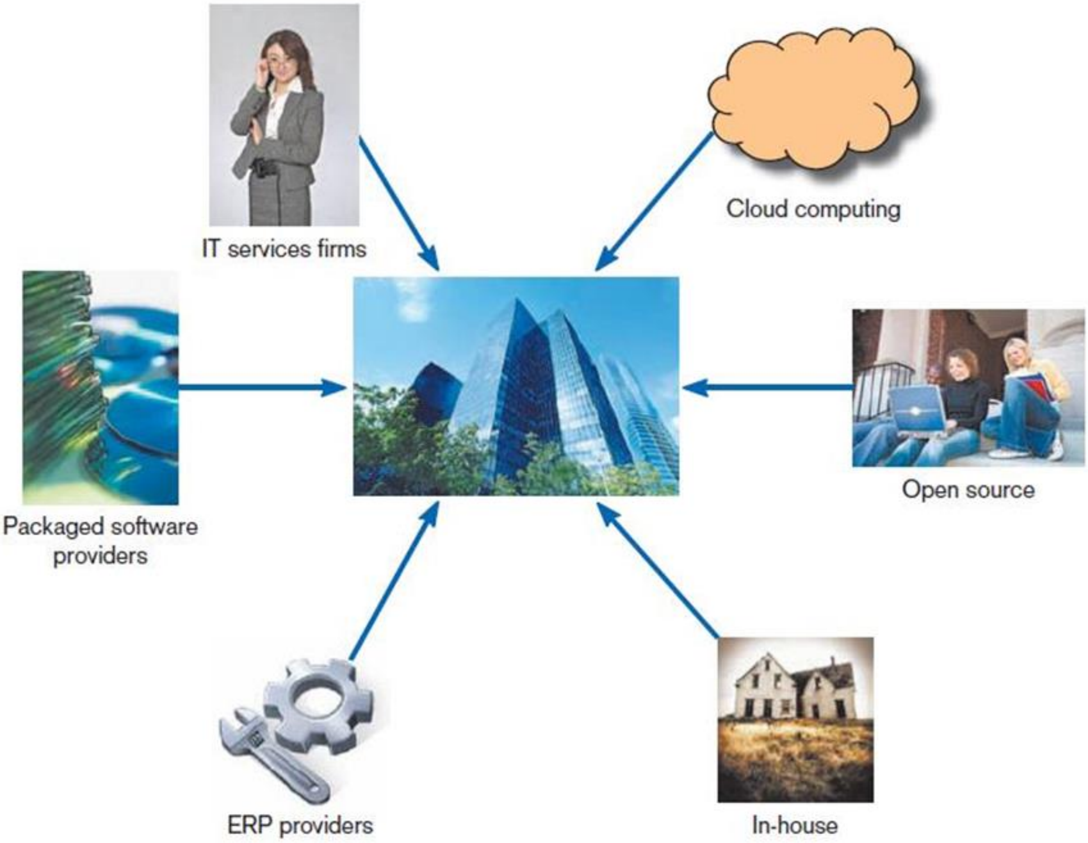
1. Systems Acquisition: Outsourcing

Outsourcing: Turning over responsibility of some or all of an organization's IS applications and operations to an outside firm

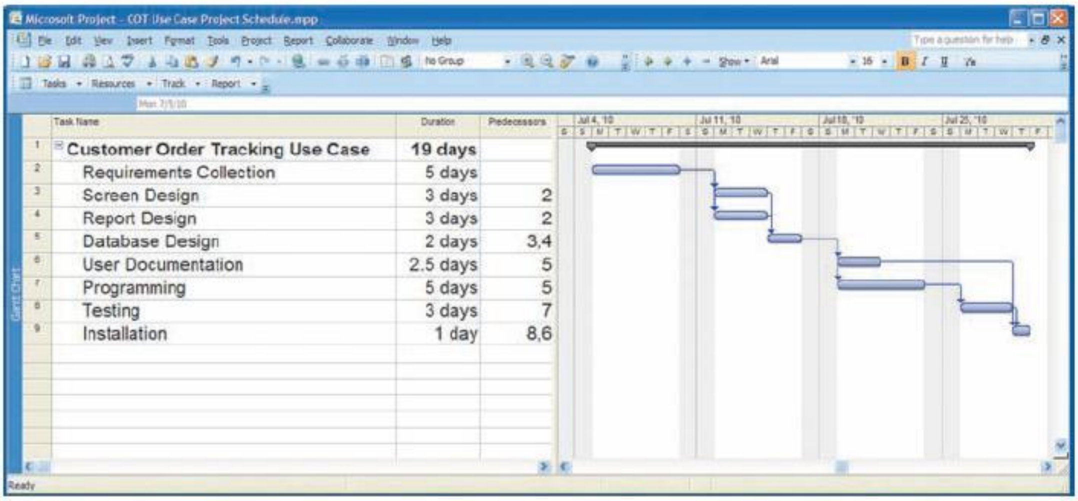
Ex. Shell Oil -> EDS, T-Systems, AT&T

- **Reasons to outsource**
  - Cost-effectiveness
  - Take advantage of economies of scale
  - Make up for lack of in-house knowledge
  - Free up internal resources
  - Reduce time to market
  - Increase process efficiencies
  - System development is a non-core activity for the organization

2. Sources of Software



- **IT services firms**
  - Help companies develop custom information systems for internal use
  - Develop, host, and run applications for customers
  - Provide other services
- **Packaged software producers**
  - Serve many market segments
  - Provide software ranging from broad-based packages (i.e. general ledger) to niche packages (i.e. day care management), running on different platforms
  - Pre-packaged, off-the-shelf software
  - Off-the-shelf software, at best, meets 70% of organizations' needs.



Microsoft Project - COT Use Case Project Schedule.mpp

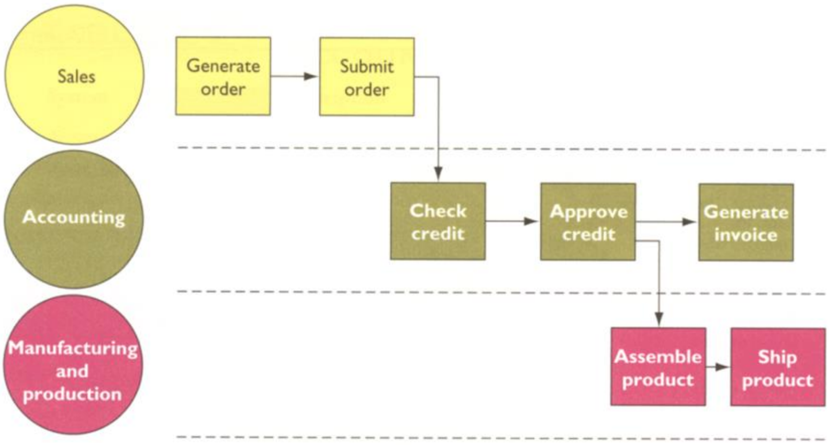
	Task Name	Duration	Predecessors
1	**Customer Order Tracking Use Case**	**19 days**	
2	Requirements Collection	5 days	
3	Screen Design	3 days	2
4	Report Design	3 days	2
5	Database Design	2 days	3,4
6	User Documentation	2.5 days	5
7	Programming	5 days	5
8	Testing	3 days	7
9	Installation	1 day	8,6

File Edit View Insert Format Tools Project Report Collaborate Window Help
No Group
Tasks Resources Track Report
Gantt Chart
Jul 4, '10
Jul 11, '10
Jul 18, '10
Jul 25, '10
Ready

Microsoft Project(上圖)

- **Enterprise-wide solutions**
  - Many firms have chosen complete software solutions, called enterprise solutions or Enterprise Resource Planning (ERP) systems
    - ✓ ERP systems integrate individual traditional business functions into modules enabling a single seamless transaction to cut across functional boundaries.
    - ✓ A single repository of data for all aspects of a business process and the flexibility of the modules
    - ✓ Focus on businesses rather than on business functional areas

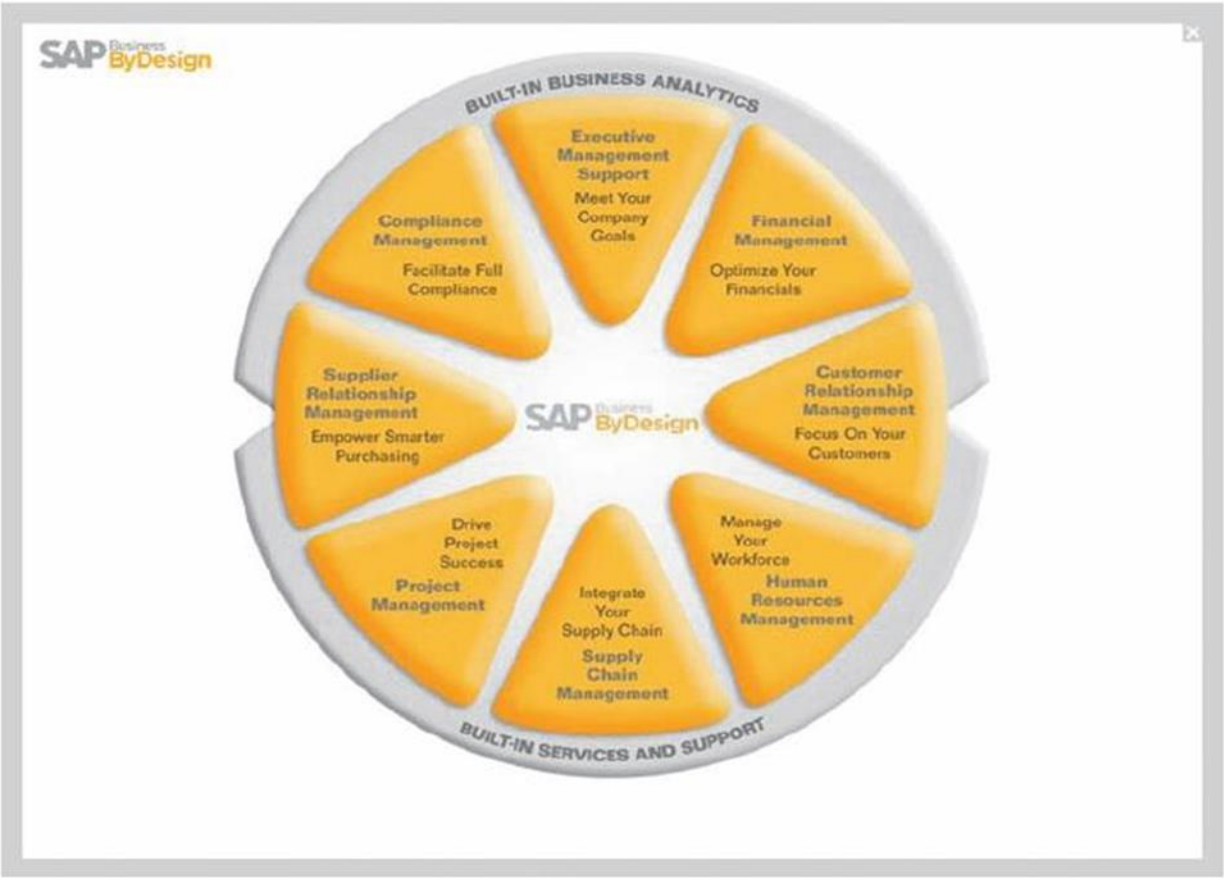
Order Processing 下圖



- **Disadvantages**
  - ✓ Complex: implementation can take a long time to complete

✓ Expensive: reliance on consultants or employees of the software vendor

✓ Changes of business processes in some cases


SAP Business ByDesign
BUILT-IN BUSINESS ANALYTICS
Executive Management Support
Meet Your Company Goals
Financial Management
Optimize Your Financials
Customer Relationship Management
Focus On Your Customers
Manage Your Workforce
Human Resources Management
Integrate Your Supply Chain
Supply Chain Management
Drive Project Success
Project Management
Supplier Relationship Management
Empower Smarter Purchasing
Compliance Management
Facilitate Full Compliance
SAP Business ByDesign
BUILT-IN SERVICES AND SUPPORT

SAP's Business ByDesign, for medium sized companies.

➢ Cloud computing

- The provision of computing resources, including applications, over the Internet, so customers do not have to invest in the computing infrastructure needed to run and maintain the resources

✓ Organizations rent apps or license apps from 3rd-party providers who run the apps at remote sites

✓ Users have access to the apps through the Internet or through VPN

✓ The app provider buys, installs, maintains, and upgrades the apps

✓ Users pay on a pay-use basis or they license the software, typically month to month

- Examples:
  - ✓ Google Drive – users store what they want on servers (hardware as a service, HaaS)
  - ✓ Salesforce.com – online customer relationship management (CRM) software (software as a service, SaaS)
  - ✓ Microsoft Azure platform (platform as a service, PaaS; infrastructure as a service, IaaS)
  - ✓ Amazon.com cloud infrastructure and services

- **Benefits**:
  - ✓ Free internal IT staff
  - ✓ Lower cost and faster access to application than via internal development (an expensive and time-consuming process)
  - ✓ Speed to market and better performance

- **Concerns**
  - ✓ Security
  - ✓ Reliability
  - ✓ Regulation compliance

- 3 steps process for secure migration to cloud
  - ✓ Have the company's security experts involved early
  - ✓ Set realistic security requirements
  - ✓ Do an honest risk assessment

➢ **Open source software**

- Freely available including source code
- Developed by a community (e.g., SourceForge.net) of interested people
- Performs the same functions as commercial software
- Examples: Linux, mySQL, Firefox
- How to make money?
  - ✓ Provide maintenance and other services

- ✓ Sell a more featured version of the free software

- **In-house developers**

- A larger maintenance burden than other development methods
- If sufficient system development expertise with the chosen platform exists in-house, then some or all of the system can be developed by the organization’s own staff.
- Hybrid solutions involving some purchased and some in-house components are common.

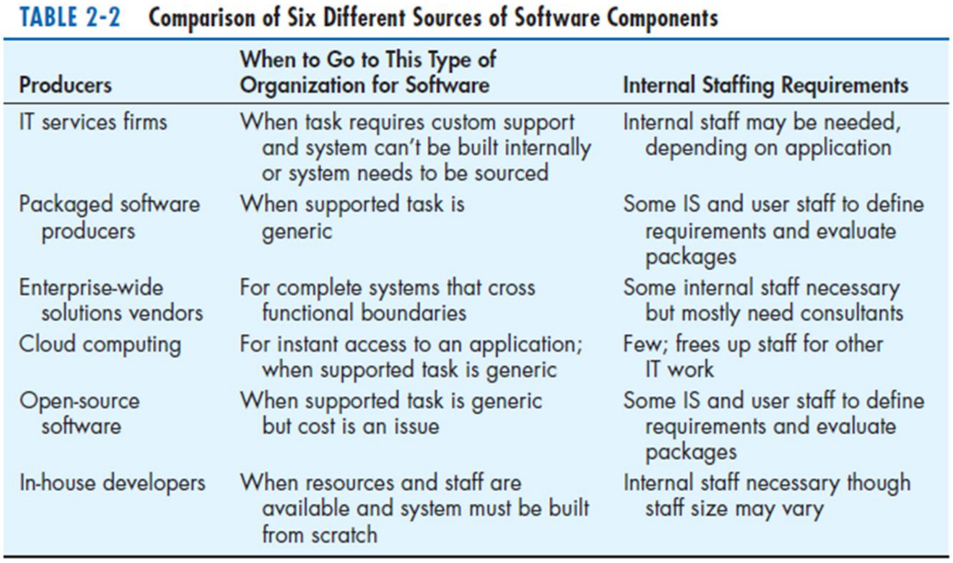


TABLE 2-2 Comparison of Six Different Sources of Software Components

Producers	When to Go to This Type of Organization for Software	Internal Staffing Requirements
IT services firms	When task requires custom support and system can’t be built internally or system needs to be sourced	Internal staff may be needed, depending on application
Packaged software producers	When supported task is generic	Some IS and user staff to define requirements and evaluate packages
Enterprise-wide solutions vendors	For complete systems that cross functional boundaries	Some internal staff necessary but mostly need consultants
Cloud computing	For instant access to an application; when supported task is generic	Few; frees up staff for other IT work
Open-source software	When supported task is generic but cost is an issue	Some IS and user staff to define requirements and evaluate packages
In-house developers	When resources and staff are available and system must be built from scratch	Internal staff necessary though staff size may vary

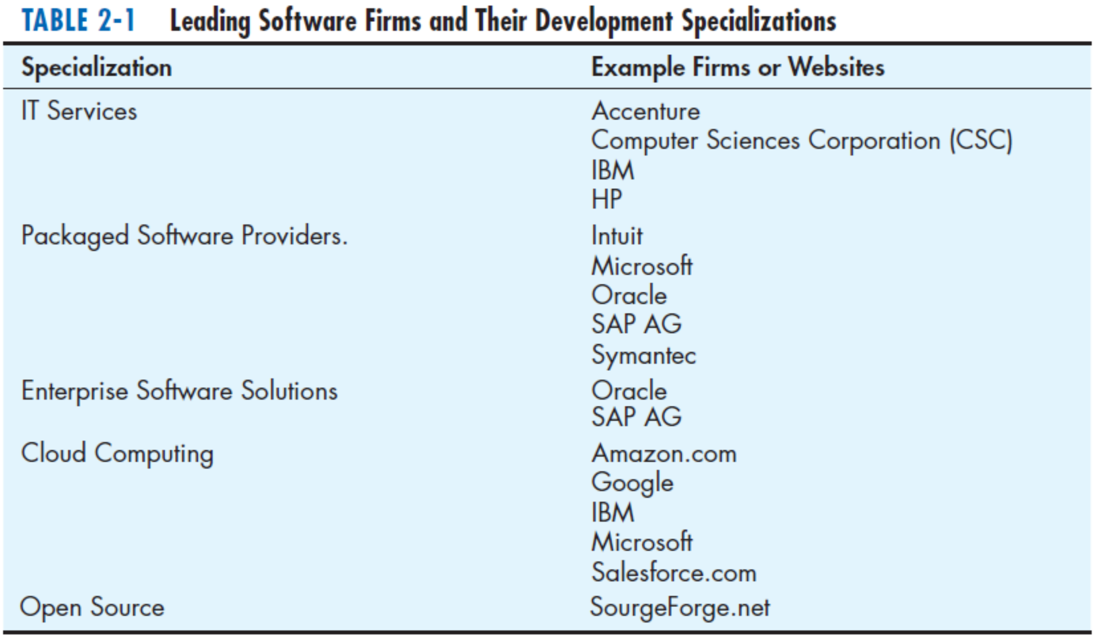


TABLE 2-1 Leading Software Firms and Their Development Specializations

Specialization	Example Firms or Websites
IT Services	Accenture Computer Sciences Corporation (CSC) IBM HP
Packaged Software Providers.	Intuit Microsoft Oracle SAP AG Symantec
Enterprise Software Solutions	Oracle SAP AG
Cloud Computing	Amazon.com Google IBM Microsoft Salesforce.com
Open Source	SourgeForge.net

3. Selecting Off-the-Shelf Software

- **Cost**:
  comparing the cost of developing the same system in-house with the cost of purchasing, licensing the software package, upgrades or annual license fees, maintenance

- **Functionality**:
  the tasks that the software can perform and the mandatory, essential, and desired system features

- **Vendor support:**
  whether and how much support the vendor can provide and at what cost
  ✓ Installation, training, and provisions of help as problems arise

- **Viability of vendor**:
  can vendor continue to adapt/update software to changes in systems software and hardware

- **Flexibility**: the ease with which software is customized

- **Documentation**: understandable and up-to-date user's manual and technical documentation

- **Response time**: how long it takes the software package to respond to the user's requests in an interactive session
  - ✓ How long it takes the software package to complete running a job

- **Ease of installation**: a measure of the difficulty of loading the software and making it operational

4. Validating Purchased Software Information:

- Collect information from vendor
- Software documentation
- Technical marketing literature
- Information provided upon request
  - ✓ **request for proposal (RFP)(徵求建議書)**

    a document provided to vendors to ask them to propose hardware and system software that will meet the requirements of a new system.

  - ✓ **Request For Quote (RFQ)(詢價)**

    vendor bids, a variety of information sources

5. Information Sources

- Vendor's proposal
- Running software through a series of tests
- Feedback from other users of the vendor's product
- Independent software testing services (e.g., Auerbach Publishers and DataPro)
- Articles in trade publications

6. Reuse

- The use of previously written software resources, especially objects and components, in new applications
  - ✓ Increase productivity, decrease development time (minimize schedule overrun), result in higher-quality software with

lower defect rates (decrease maintenance cost)

- Commonly applied to two different development technologies:

  ✓ **Object-oriented development**
  Object class encapsulates data and behavior of common organizational entities (e.g. employees)

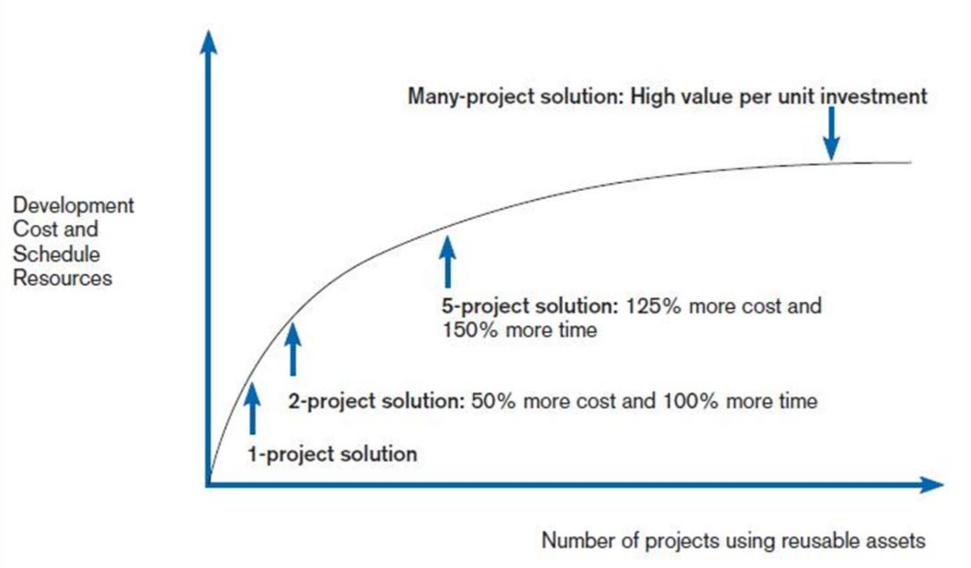
  ⇨ The use of object classes in more than one application

  ✓ **Component-based development**
  Components can be as small as objects or as large as pieces of software that handle single business functions

  ⇨ the assembly of an application from many different components at many different levels of complexity and size (e.g. Currency conversion).

- **Costs and Benefits of Reuse**

Costs and Benefits of Reuse



- **Approaches to Reuse**

  - ✓ **Ad-hoc(特定)**: individuals are free to find or develop reusable assets on their own
    - ⇨ Not really an approach at all
    - ⇨ Few organizational rewards
    - ⇨ Storage is not an issue

  - ✓ **Facilitated**: developers are encouraged, not required, to practice reuse
    - ⇨ Some tools and techniques are available for developing and sharing reusable assets
    - ⇨ Some may be assigned the role of evangelist(傳教士)
    - ⇨ Little is done to track the quality and use of reusable assets
    - ⇨ Overall corporate investment is small

  - ✓ **Managed**: the development, sharing, and adoption of reusable assets is mandated
    - ⇨ Processes and policies are established to ensure that reuse is practiced, that the results are measured, that the quality of reusable assets are good
    - ⇨ The focus is on identifying existing assets from various sources

  - ✓ **Designed**: assets mandated for reuse as they are being designed for specific applications
    - ⇨ The focus is more on developing reusable assets than on finding existing assets
    - ⇨ A corporate reuse office may be established to monitor and manage the overall methodology

TABLE 2-3 Four Approaches to Reuse

Approach	Reuse Level	Cost	Policies & Procedures
Ad hoc	None to low	Low	None
Facilitated	Low	Low	Developers are encouraged to reuse but are not required to do so.
Managed	Moderate	Moderate	Development, sharing, and adoption of reusable assets are mandated; organizational policies are established for documentation, packaging, and certification.
Designed	High	High	Reuse is mandated; policies are put in place so that reuse effectiveness can be measured; code must be designed for reuse during initial development, regardless of the application it is originally designed for; there may be a corporate office for reuse.

(*Source:* Based on Flashline, Inc. and Griss, 2003.)