

## End-User Computing

### End-User Computing and Systems Tools

#### What is End-User Computing (EUC)?

It refers to computer systems and platforms that are meant to allow non-programmers who use computers (the **End-Users**) to create working applications and outputs. These tools, techniques, and approaches can be used to involve, enable, and integrate people with almost no background in programming into the world of computing systems development. EUC is broad and may encompass different meanings that are more or less related, but has the overarching context of allowing end-users to better control their computing environment without the aid of real programmers or developers.

End-user computing encompasses all uses of computers by end-users that the programmers develop for. With this broad definition, all computing being done that is not related to development can be considered as EUC.

#### Types of EUC

EUC covers a broad range of user-facing resources:

1. **Desktop and Laptop Computers** – This type of EUC involves the most common hardware aspect of an EUC solution, namely computers. These can be customized for any specification of an end-user.
2. **Desktop Operating Systems and Applications** – This type of EUC covers the software aspect of desktop and laptop computers; they can either come packaged with an operating system (OS) or sold/developed separately. Well-known examples of this type are the System and Administrator Tools for the Windows, which contain simple tools such as the Notepad, Calculator, and the Command Prompt, and Application Suites (like Microsoft Office and Adobe Master Collection).
3. **Smartphones and Wearables** – This type of EUC primarily focuses on mobile hardware platforms (such as smartphones, tablets, and smartwatches) and the software they can use (such as apps and widgets)
4. **Mobile, Web, and Cloud Applications** – This type of EUC gives priority to mobility and connectivity regardless of platform, and is commonly offered as a service and not as an actual application. Examples of this are e-mail, instant messaging, and cloud storage.
5. **Virtual Desktops and Application** – This type of EUC further enhances mobility and connectivity through the development of online, cloud-based computing solutions commonly offered “as-a-service” (as opposed to solutions offered “as-a-product”), which eliminates the need for hardware and software specifications (thus popularizing the “Bring Your Own Device” (BYOD) trend). Examples of this are virtual workplace suites (such as Microsoft Office 365).

#### What is End-User Development (EUD)?

EUD is a practice in EUC that allows end-users to develop their information systems, usually with the support of IT professionals and professional systems developers. The practical involvement of end-users in the application development process will sometimes necessitate giving them access to computing facilities (such as computer workstations connected to relevant networks and mainframes), as well as computing resources (such as Internet access, elevated data access, and software training tools).

#### Benefits of End-User Computing

Both EUC and EUD can give any organization a plethora of benefits, including:

- **Enhanced productivity of professional and white-collar workers** – through the use of information systems, for, and by end-users, the productivity of certain aspects of an organization may increase via process streamlining and/or automation.
- **Empowerment of end-users** – by allows end-users to create their information system solutions, an organization can empower its members by giving them skills to create viable systems solutions.
- **Reduction/Elimination of unnecessary steps on business processes** – by involving end-users, who are mainly people who handle business processes, application development for specific processes may improve them, primarily by revising the steps that make the process, or even eliminating some steps to make it easier and effective.
- **Overcoming the shortage of DP professionals** – by equipping end-users with software training tools, the involvement of DP professionals on some levels of an organization can be lessened, therefore minimizing the need for additional IT human resources.
- **Provision of user-friendly and responsive systems** – Since end-users aren't programmers, the information system solutions they develop can be simple. But since end-user process involvement is also usually direct, systems solutions

that they may come up with can also be beneficial.

- **Overcoming the implementation problems for applications by transferring this process to the user** – System implementation has always been a significant problem for developers. If users develop their systems, the implementation problem goes away.

### Risks of End-User Computing

EUC is not a process for every organization. Some risks to consider are:

- **Errors in analysis** – Poorly trained end-users often are incapable of correctly analyzing data or systems. The resulting software is, therefore, usually of questionable quality.
- **Lack of documentation** – Most end-users are not trained in formal techniques of analysis and design. Documentation is often inadequate or even non-existent, making maintenance difficult and expensive.
- **Faulty Model** – Many Decision Support Systems (DSS) rely on corporate models developed by End-users for use with spreadsheets. Recent research has indicated that as many as 38% of these spreadsheets may contain errors. As senior executives use these systems as aids in strategic decision-making, the consequences may be difficult to assess.
- **Possible Security/Piracy Issue** – Since end-user developed software may not go through the implementation of security measures, and because end-users are given computing assets for development, organization data or even the actual software itself may be at risk of being manipulated and/or stolen.

### End-User Computing Tools

There are two (2) classes of EUC tools:

1. **Application Packages** – these are pre-written software packages that are marketed commercially. They support standard business functions such as payroll, ledgers, scheduling, inventory control, etc. Most of them are customizable via key parameters. A typical example would be the Microsoft Office Suite.
2. **Fourth-Generation Programming Languages** – these are programming languages that allow end-users to develop their computing solutions and even consolidate them together to form a small information system. These languages can be run on most types of computers. One typical example would be the SQL query language used for managing databases.

### End-User Systems Tools

There are tools to which end-users may have access, and for which they may need support:

- **Text and Multimedia Handling Tools** – word processing, desktop publishing, web-publishing, presentation software, document management systems, work-flow management systems;
- **Data Handling Tools** – spreadsheets, statistical packages, decision support systems, databases;
- **Communication Tools** – e-mail, voice over IP (VoIP), fax, WAP, pagers;
- **Office Automation Tools** – diary management, electronic notebooks, directories, project management tools, personal digital assistants, Bluetooth;
- **Group Systems / Computer Supported Collaborative Work** – teleconferencing, virtual workspaces/desktops;
- **Graphic Design** – graphic software, computer-aided design;
- **Knowledge Management** – expert systems, data mining, information retrieval.

## Office Automation and Office Information Systems

### What is Office Automation?

Office automation refers to the complete integration of basic office requirements for a department within an organization. These requirements include word processing, electronic data filing, diary management, and communications. Office automation aims to organize the functions in such a way that they do not have to be done separately or use additional workforce, equipment, or resources.

### What is an Office Information System?

An Office Information System (OIS) is a type of information system that uses the software, hardware, and networking to improve workflow and communication of office workers. It supports a collection of business office activities that allow both management and the workforce to manage their jobs efficiently. These systems can evolve and become automated during their lifetime to increase their flexibility and effectiveness.

An OIS can:

- Facilitate electronic communication via e-mail and instant messaging.
- Manage audio-video communication via a telephony system, a teleconference system, or a prompt directory system.
- Facilitate record management via databases and/or data servers.
- Automation of business-specific processes to reduce/eliminate manpower requirements.
- Provide EUC to enhance end-user efficiency (particularly employees) further.

## Applications of Office Automation

Office automation, and by extension, an OIS, can have a number of the following tools available, depending on organizational needs:

- **Functions** – These are operations or actions that can be performed by activating a function key or a key sequence on a workstation. Examples of such features are Cut, Copy, Delete, Move, Search, Calculate, Change Font, and Print.
- **Software Packages** – These are bundled applications that can interact with a system's resources to perform tasks. These applications provide functionality for a specific requirement, such as the production of textual documents, creation of spreadsheets and databases, presentation of information, etc. Two (2) common examples of this type of software are the Microsoft Office Suite and Google Docs.
- **Process Software** – These are software, either individual or bundled, that provide specific capabilities other than those commonly offered. They are usually categorized as a specific type of software, e.g., database management, desktop publishing, computer-assisted design, etc. An example of this is Autodesk's AutoCAD.
- **Word Processing** – This type of software is designed for developing textual documents; it permits users to create, format, modify, and print documents electronically. Examples of word processing software include Notepad and Microsoft Word.
- **Electronic Spreadsheet** – This type of software is used extensively for accounting and financial purposes, and is designed for maintaining, manipulating, and calculating numerical data. A typical electronic spreadsheet consists of a matrix of rows and columns similar to the conventional columnar pad. The user can add, delete, or modify the numerical records maintained in these spreadsheets, as well as provides formulas, functions, and commands to manipulate or calculate the data to meet multiple report formats. A popular example of this is Microsoft Excel
- **Database Management** - Database management software provides capability for organized electronic storage of information in general categories or files. It allows the user to rearrange the order and number of items of information in printed form, and to search for and display specific pieces of information. Examples for this type are Microsoft Access and MySQL.
- **Desktop Publishing** - Desktop publishing software is used to lay out text, graphics, and pictures on a page. With desktop publishing software, the user can perform such tasks as integrating text and graphics on a page, increasing or decreasing the size of charts, graphs, or pictures and using multiple styles and sizes of type. The distinction between desktop publishing software and word processing software is diminishing as the latter software type takes on more exceptional capabilities.
- **Graphics Design** - Graphics software typically allows the creation of charts and graphs based on data provided through a spreadsheet or by the user directly. Some graphics software allows the user to easily switch from one form of presentation to another for different uses. For example, a given set of budget figures might be represented as a bar chart, stacked bar chart, line chart, or pie chart. Most graphics software also allows the creation or selection and placement of pictures and symbols. Examples for this type are Microsoft PowerPoint, which focuses on graphic presentations, and Adobe Photoshop, which primarily focuses on actual graphic design.
- **Project Management** - Project management software permits the user to identify tasks, task relationships, resources, and time requirements of a project; to manipulate that information for planning purposes; to track work progress against the plans, and to report and display information about the project in varied ways. The software automatically adjusts such information as starting, ending, and milestone dates for the project based on changes in assumptions and estimates introduced by the user.
- **Calendar** - Calendar software generally permits the user to schedule events on one or more calendars. Additional functions may include capabilities for such purposes as "to do" lists, short notes and reminders, and recording time spent on various projects. This software type is slowly being integrated across all possible platforms and systems and

is therefore considered as a minor consideration for office automation.

- Electronic Communication – This type of software permits sending information to users through their computers' communication links. For example, electronic mail and memos can be sent and received from designated distribution lists, while instant messaging allows organization employees to communicate quickly and in real-time. An example of this type is Microsoft Outlook.

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