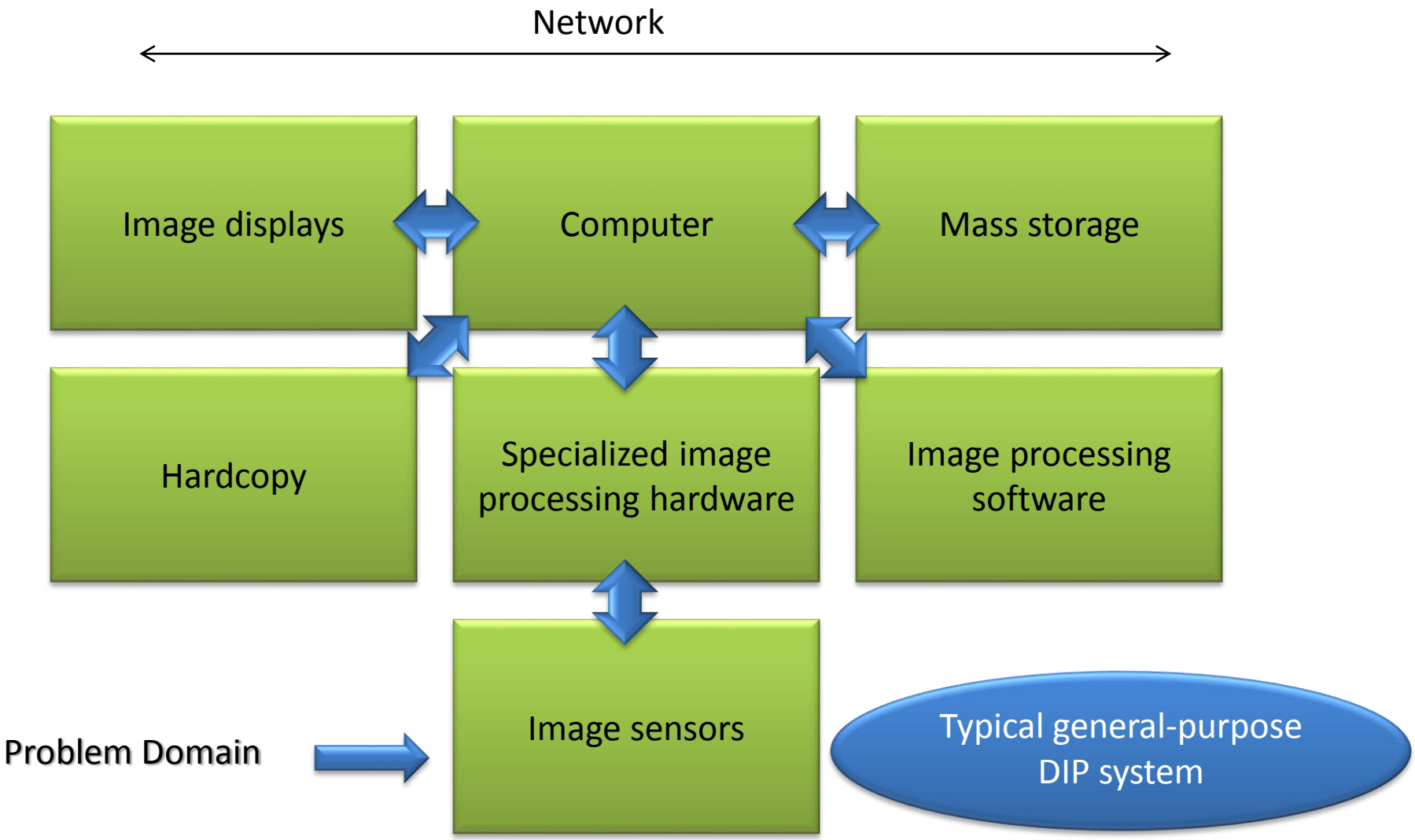
Components of an Image Processing System



Components of an Image Processing System

1. **Image Sensors**

   Two elements are required to acquire digital images. The first is the physical device that is sensitive to the energy radiated by the object we wish to image (*Sensor*). The second, called a *digitizer*, is a device for converting the output of the physical sensing device into digital form.

Components of an Image Processing System

2. Specialized Image Processing Hardware

Usually consists of the digitizer, mentioned before, plus hardware that performs other primitive operations, such as an arithmetic logic unit (ALU), which performs arithmetic and logical operations in parallel on entire images.

This type of hardware sometimes is called a front-end subsystem, and its most distinguishing characteristic is speed. In other words, this unit performs functions that require fast data throughputs that the typical main computer cannot handle.

Components of an Image Processing System

3. **Computer**

   The computer in an image processing system is a general-purpose computer and can range from a PC to a supercomputer. In dedicated applications, sometimes specially designed computers are used to achieve a required level of performance.

Components of an Image Processing System

4. Image Processing Software

Software for image processing consists of specialized modules that perform specific tasks. A well-designed package also includes the capability for the user to write code that, as a minimum, utilizes the specialized modules.

Components of an Image Processing System

5. Mass Storage Capability

Mass storage capability is a must in a image processing applications. And image of sized 1024 * 1024 pixels requires one megabyte of storage space if the image is not compressed.

Digital storage for image processing applications falls into three principal categories:

1. Short-term storage for use during processing.
2. on line storage for relatively fast recall
3. Archival storage, characterized by infrequent access

Components of an Image Processing System

5. Mass Storage Capability

One method of providing short-term storage is computer memory. Another is by specialized boards, called frame buffers, that store one or more images and can be accessed rapidly.

The on-line storage method, allows virtually instantaneous image zoom, as well as scroll (vertical shifts) and pan (horizontal shifts). On-line storage generally takes the form of magnetic disks and optical-media storage. The key factor characterizing on-line storage is frequent access to the stored data.

Finally, archival storage is characterized by massive storage requirements but infrequent need for access.

Components of an Image Processing System

6. Image Displays

The displays in use today are mainly color (preferably flat screen) TV monitors. Monitors are driven by the outputs of the image and graphics display cards that are an integral part of a computer system.

Components of an Image Processing System

7. Hardcopy devices

Used for recording images, include laser printers, film cameras, heat-sensitive devices, inkjet units and digital units, such as optical and CD-Rom disks.

Components of an Image Processing System

8. Networking

Is almost a default function in any computer system, in use today. Because of the large amount of data inherent in image processing applications the key consideration in image transmission is bandwidth.

In dedicated networks, this typically is not a problem, but communications with remote sites via the internet are not always as efficient.