Utility Computing

main idea

With increasing popularity and usage, large grid installations have faced new problems, such as excessive spikes (increased level) in demand for resources coupled with (joined with) strategic and adversarial (opposing) behavior by users. Initially, grid resource management techniques did not ensure fair and equitable (fair) access to resources in many systems. Traditional metrics (throughput (the amount of data that can be transferred through a device), waiting time, and slowdown) failed to capture the more subtle8 (implied) requirements of users. There were no real incentives (motivation; reason) for users to be flexible about resource requirements or job deadlines, nor provisions (arrangement; preparation) for accommodating (help; satisfy) users with urgent (important) work.

main idea

In utility computing environments, users assign (determine) a "utility" value to their jobs, where utility is a fixed or time-varying valuation that captures various QoS (quality of service) constraints (deadline, importance, satisfaction). The valuation is the amount they are willing to pay a service provider to satisfy their demands. The service providers then attempt to maximize their own utility, where said utility may directly correlate with their profit. Providers can choose to prioritize high yield (i.e., profit per unit of resource) user jobs, leading to a scenario (situation) where shared systems are viewed as a marketplace, where users compete for resources based on the perceived (?) utility or value of their jobs. Further information and comparison of these utility computing environments are available in an extensive survey of these platforms.

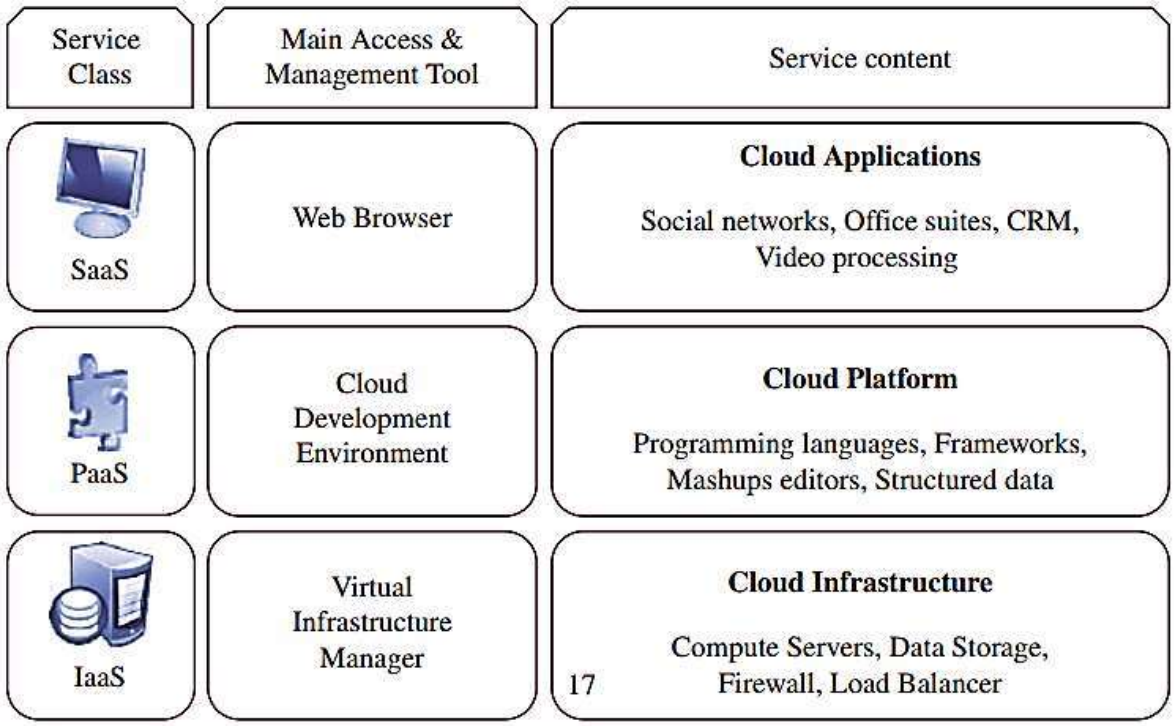
After You Read

Understanding the Text

A. Based on the information in the text, complete the following chart.

	Subject	Characteristics
Technologies that form the base of cloud computing	Web services	Software integration
	Grid computing	aggregation of distributed resources; distributed computing
	Utility computing	assigning a utility value to user jobs
Cloud ecosystem as a whole	Clouds	convergence of hardware virtualization; Internet technologies; distributed computing; and systems management

B. Using the information in the text, say what this figure shows. Compare your answer with a partner.



software as a service

Platform as a service

Infrastructure as a service

Reading strategy

Skimming

When you skim a reading selection, you read it quickly to learn about its content and organization. You do not read every word. Instead, your eyes move very quickly over the selection, trying to find general information (e.g., the topic of a reading).

Read the two questions below. Then, take one minute to skim the following reading for the answers. Discuss your answers with a partner.

1. What is the topic of the text?

2. Who is the audience for this reading?

Cloud computing has recently emerged as one of the buzzwords (technical words) in the ICT industry. Numerous IT vendors (a company or person that offers sth for sale) are promising to offer computation, storage, and application hosting services and to provide coverage in several continents, offering service-level agreements (?)-backed (supported) performance and uptime (time during which a system works properly) promises for their services, While these "clouds" are the natural evolution of traditional data centers, they are distinguished by exposing (offer; present) resources as standards-based Web services and following a "utility" pricing model where customers are charged based on their utilization of computational resources, storage, and transfer of data. They offer subscription-based access to infrastructure, platforms, and applications that are popularly referred to as IaaS (Infrastructure as a Service), PaaS (Platform as a Service) and Saas (Software as a Service).

subscription: the amount of money that you pay to receive sth

Building Vocabulary

Using the Context

Many words in English have more than one meaning. Moreover, when you read, there may be words in texts that are new to you. Thus, as you read, it's important to use context clues (the surrounding words and ideas) and affixation (a letter or group of letters added to the beginning or end of a word to change its meaning) to guess the correct meaning of words.

Examples from Cloud Computing in a Nutshell:

1. When plugging an electric appliance into an outlet, we care neither how electric power is generated nor how it gets to that outlet. This is possible because electricity is virtualized; that is, it is readily available from a wall socket that hides power generation stations and a huge distribution grid. (Paragraph 1)

Contextual Clues:

• The context indicates that the word is used as a verb. (Something is virtualized.)

• The word indicates the form of electricity.

• The words that follow suggest that the mechanism of electricity when used is not known.

• We just see its effects.

• The word may mean "made to be effective by the use of a socket".

• The dictionary definition of "virtualize" is "appear to exist".

2. Figure 1-1 shows the convergence of technology fields that significantly advanced and contributed to the advent of cloud computing. (Paragraph 5)

Affixation:

• Discover the context - the context indicates that the word is a noun.

• Isolate the prefix -"con" is a prefix meaning "'with, together".

• Separate the suffix -ence" is a noun marker.

• Say the stem or root - the root word is "'verge".

• Examine the stem or root -"verge" means "bend. incline".

boundary; end

• Try the dictionary - the word means "the condition of coming together and uniting in a common interest or focus".

A. Determine the meaning of the boldfaced words using the information in the reading, Cloud Computing in a Nutshell.

1. The emergence of Web services open standards has significantly contributed to advances in the domain of software integration. (Paragraph 11)

Contextual Clues:

• The word is used as …… .

• The word has resulted in …… .

• The advances are in the domain of …… .

• The word may mean that 'it helped in' software integration.

• The dictionary definition of "contribute" is "play a role in bringing about a result". So, "contributed" means …… .

2.In addition, the unavailability of efficient computer networks meant that IT infrastructure should be hosted in proximity to where it would be utilized (paragraph

8).

Affixation:

• Discover the context ……. .

• Isolate the prefix ……. .

• Separate the suffix ……. .

• Say the stem or root ……. .

• Examine the stem or root ……. .

• Try the dictionary ……. .

Following the same procedures, guess the meaning of the boldfaced words below.

1. As with any **burgeoning** new technology that enjoys intense commercial attention, the use of data mining is surrounded by a great deal of **hype** in the technical and sometimes the popular-**press**.

advertising sth using exaggeration

media

Contextual Clues:

……

……. .

……. .

2. A **comprehensive** software resource, written in the Java language, has been created to illustrate the ideas in the book.

Contextual Clues:

com: completely; together

prɪˈhɛnsaɪl: adapted to capture; capable of grasping or holding

……

……. .

……. .

The word perceive bas got two different meanings in the passage.

1. Activities associated with one user or virtual organization can influence the performance perceived by other users using the same platform.
2. Providers can choose to prioritize high yield user jobs, leading to a scenario where shared systems are viewed as a marketplace, where users compete for resources based on the perceived utility or value of their jobs.

In the first sentence "**perceived**" means *understood* while in the second sentence. **"perceived value"** means *the amount of satisfaction a product provides and how it relates to demand*.

Use the information in the box to decide which idea the word 'perceive' presents in each sentence.

1. We assessed the perceived utility of data collected through ArboNET.

2. This discovery was perceived as a major breakthrough.

3. A study on perceived utility of Airman resilience training program was designed to improve airman's reactions to stress.

4. And to the extent that our minds still perceive the Internet as an extension of offline things, we will fail to see its most revolutionary possibilities.

development

innovative; different

Consider some of the uses of **'as'** which is an important and difficult word.

Expressing Functions

- In the consumer Web, information and services may be programmatically aggregated, acting **as** building blocks of complex compositions, called mashups.

Giving Examples

It is sometimes possible to use *as* and *like* when we are giving examples. But the commonest expression is *such as* Examples:

- Computing itself, to be considered fully virtualized, must allow computers to be built from distributed components such **as** processing, storage, data, and software resources.

Showing the form of something

- It denotes a model on which a computing infrastructure is viewed **as** a cloud.

Note: As + participle roughly has the same meaning as 'in the form of
Example:

- The virtual machine monitors **as** depicted in the figure mediates access to the physical hardware.

D. Defining something

Computing delivered as a utility can be defined as on demand delivery of infrastructure. applications, and business processes over the Internet for a fee".

- Ensuring QoS in grids has been perceived **as** a difficult endeavor.
  effort

Considering different uses and meanings of 'as', complete the following sentences.

offered as/ known as/ as/ such as/ viewed as/ act as

1. These abstraction levels can be ..... a layered architecture where services of a higher layer can be composed from services of the underlying layer.

2. Offering virtualized resources (computation, storage, and communication) on demand is ..... Infrastructure as a Service (IaaS).

3. Multiple programming models and specialized services (e.g., data access, authentication, and payments) are ..... building blocks to new applications.

verifying

4. Google AppEngine, an example of Platform as a Service, offers scalable

able to be changed in size or scale

environments for developing and hosting Web applications, which should be written in specific programming languages ..... Python or Java.

5. Armbrust et al propose definitions for public cloud ..... a "cloud made available in a pay-as-you- go manner to the general public".

6. Service-level agreement (SLAs), which include QoS requirements must be ideally set up between consumers and cloud computing providers to ..... warranty.

.....

After You Read

Understanding the Text

A. For each item below, circle the best answer.

1. It is inferred from the text that ..... .

a. lying hidden in oceans of data is useful information

p.p. of lie: remain; be kept

b. people have long been familiar with data mining

c. as the flood of data swells, the machines begin to extract useful information from data

expand; increase in volume

d. people have long been aware of the algorithms that underlie data

2. According to the text, which of the following is true?

a. Artificial intelligence works as the brain does.

b. Patterns based on neural network technique are the most reliable ones.

c. Data analysis can lead to economic advantages.

d. Unstructured patterns are of no use.

3. As we understand from the text, ...

read off: read the measurement on a graph

a. it is possible to read. sets of rules directly off a decision tree

b. decision tree induction is an error-prone technique

analysis

tending to cause errors

c. it is reasonable to use the clustering method more often than the neural networks method

d. artificial neural networks have not promoted the interests of companies

4. We can conclude from the text that data mining ..... .

a. is one of the ways of data analysis that brings forth information

produce

b. provides the technical basis of data analysis

c. extracts useful information from data already present m databases

d. discovers algorithms previously unknown on existing data

B. Look at the contact lens data in this table and complete the structural description that follows.

Age	Spectacle prescription	Astigmatism	Tear production rate	Recommended lenses
young	myope	no	reduced	none
young	myope	no	normal	soft
young	myope	yes	reduced	none
young	myope	yes	normal	hard
young	hypermetrope	no	reduced	none
young	hypermetrope	no	normal	soft
young	hypermetrope	yes	reduced	none
young	hypermetrope	yes	normal	hard
pre-presbyopic	myope	no	reduced	none
pre-presbyopic	myope	no	normal	soft
pre-presbyopic	myope	yes	reduced	none
pre-presbyopic	myope	yes	normal	hard
pre-presbyopic	hypermetrope	no	reduced	none
pre-presbyopic	hypermetrope	no	normal	soft
pre-presbyopic	hypermetrope	yes	reduced	none
pre-presbyopic	hypermetrope	yes	normal	none
presbyopic	myope	no	reduced	none
presbyopic	myope	no	normal	none
presbyopic	myope	yes	reduced	none
presbyopic	myope	yes	normal	hard
presbyopic	hypermetrope	no	reduced	none
presbyopic	hypermetrope	no	normal	soft
presbyopic	hypermetrope	yes	reduced	none
presbyopic	hypermetrope	yes	normal	none

myope: a short-sighted person

If tear production rate = reduced then recommendation = ...

Otherwise, if age = young and astigmatic = ...

Then recommendation = ...

C. Work with a partner to answer the questions below.