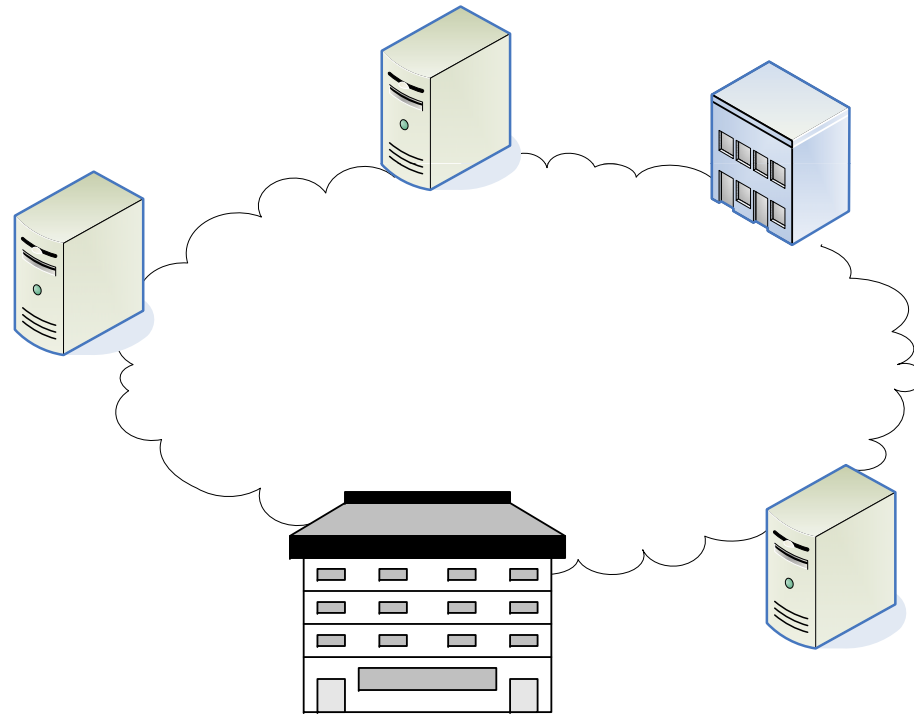


Cloud Computing

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What Is Cloud Computing?



What Is Cloud Computing?

- **Using hardware or software provided by another party over a network.**
- The network is often the Internet.
- The network is the cloud.

What Is Cloud Computing?

“Something simple like Google mail is Cloud computing. On the other end, Amazon’s cloud infrastructure can be used to run applications developed by 3rd parties that are managed by 4th parties.”

-- Chris Falkowski

Software as a Service (SaaS)

- Desktop applications
 - E.g., Google Docs and Zoho provide spreadsheets, word processors, etc.
 - Internet e-mail (gmail, Yahoo! mail, etc.)
- Business applications
 - E.g., Salesforce.com provides CRM
 - Billing software
 - Anti-spam software
- Data and functionality can be accessed from anywhere.
- Allows different licensing and payment models (subscription-based, pay-per-use, or both).

Example

The screenshot shows the Zoho website homepage. At the top, there is a navigation bar with links for Zoho Home, Forums, Blogs, Pricing, Partners, Contact Us, and FAQ. The toll-free number is 888 900 9646 and 888 204 3539. Below the navigation bar, a welcome message reads "Welcome cbieneman, Sign Out" and "You are logged into Zoho. You can select the service you need from the list below, or visit <https://personal.zoho.com> to start."

The main content area is divided into three columns:

- Productivity & Collaboration Apps:**
 - Zoho Mail:** Web-based Email Service [Try Now](#)
 - Zoho Writer:** Online Word Processor [Try Now](#)
 - Zoho Sheet:** Spreadsheets. Online [Try Now](#)
 - Zoho Show:** Online Presentation Tool [Try Now](#)
 - Zoho Docs:** Online Document Management [Try Now](#)
 - Zoho Notebook:** Online Note Taker [Try Now](#)
 - Zoho Wiki:** Easy to use, full-featured Wiki [Try Now](#)
 - Zoho Share:** Centralized Public Repository [Try Now](#)
 - Zoho Planner:** Online Organizer [Try Now](#)
- Business Apps:**
 - Zoho CRM:** 3 Users Free On-Demand CRM Solution [Try Now](#)
 - Zoho Meeting:** One on One Free Web Conferencing, Remote Support [Try Now](#)
 - Zoho Creator:** 2 Users Free Platform to Create Database Apps [Try Now](#)
 - Zoho Invoice:** 5 Invoices Free Online Invoicing. Quick and Easy [Try Now](#)
 - Zoho Projects:** 1 Project Free Project Collaboration Software [Try Now](#)
 - Zoho Reports:** Online Reporting & BI Service [Try Now](#)
 - Zoho People:** 10 Users Free HRIS & Applicant Tracking System [Try Now](#)
 - Zoho Business:** 10 Users Free Email Hosting & Office Suite [Try Now](#)
 - Zoho Marketplace:** Buy Apps -or- Post your requirement [Try Now](#)
- Utilities:**
 - Site 24x7:** Website Monitoring Service
 - Zoho Polls:** Online Polls in a snap
 - Zoho Viewer:** View and Share Documents Online
 - Zoho Challenge:** Easiest Way to Evaluate Candidates

At the bottom, there is a banner for "Zoho CRM Get your Email inside CRM" and several navigation buttons: Zoho APIs, PRESS ROOM, EVENTS, and VIDEOS. Social media icons for RSS, Twitter, and Facebook are also present.

Hardware as a Service

- Virtual servers – purchase hardware usage over the Web
 - The Amazon cloud (EC2)
 - Google App Engine
- Advantage of elasticity – only use (and pay for) as much computing capacity as you need.
- Again, model can be subscription or pay-per use, or a hybrid.

Example

- Company has popular video that goes viral.
- Millions of people download the video.
- Virtual server scales up to provide computer resources needed to serve up the video.
- Company pays only a few hundred dollars to provide the video.

Example

- Company (1st party) wants a web-based reporting application to provide reports to customers (2nd party).
- Company (1st party) hires developer (3rd party) to build application.
- Application is hosted by a cloud provider (4th party).

Price Comparison

Cloud model

- Server: \$0.10/hour per CPU (say, \$72 a month for 24 X 7)
- Database: \$0.15/month for 1 GB

Physical model

- Physical server: \$2,000
- Software costs
- Development costs
- Ongoing maintenance costs

Benefits

- Easy to scale
 - Increase users without complex installation.
 - Pay for what you need, as you need it.
 - Little or no capital investment (compare to paying thousands of dollars per physical server).
 - Virtually unlimited resources.
- Especially for smaller companies, may provide more reliable infrastructure.

Benefits

- Easy upgrades and maintenance
 - Vendor does not need to support multiple operating systems.
 - Upgrades only need to be applied to vendor's machines.
 - Vendor only needs to troubleshoot in vendor's known and controlled environment.
- Decrease IT infrastructure
 - Staff
 - Physical infrastructure
 - Simplifies disaster recovery plan

Disadvantages

- Customer may not know where or how computer services are being provided.
- Customer may not know where data is stored, or how it is protected.
- Customer can't control third parties used to provide services.
- Provider's software design needs to provide for security and redundancy
 - firewalls, modular design, encryption, etc.

Disadvantages

- Reliability: services are only as good as the provider (and the network)
 - What are the provider's service level commitments?
 - What is the provider's infrastructure?
 - Does the provider have a disaster recovery plan?
- User can't control latency & performance issues
- Joint tenancy can create issues
 - Other users can bring you down.
 - Potential compliance nightmare (e.g., HIPAA) → Chris

Private Cloud

- The network is not always the Internet
- Large corporations, universities, etc., may provide cloud services on internal networks
- May lose advantages of scalability and economies of scale
- Ameliorates risks, e.g., data privacy, reliability

What Cloud Computing Is Not

- Dedicated hosting – customer purchases a set amount of resources associated with a specific physical server.
 - Infrastructure is very similar if not the same.
- Co-location – customer owns (or leases) a machine that is physically located in a provider's location.
 - Customer may even have physical access.

The Future: Utility Computing

- Compare to the emergence of the electrical grid 100+ years ago.
- Pay-as-you-go; buy-what-you-need.
- Network appliance may become a reality.

Thank you.