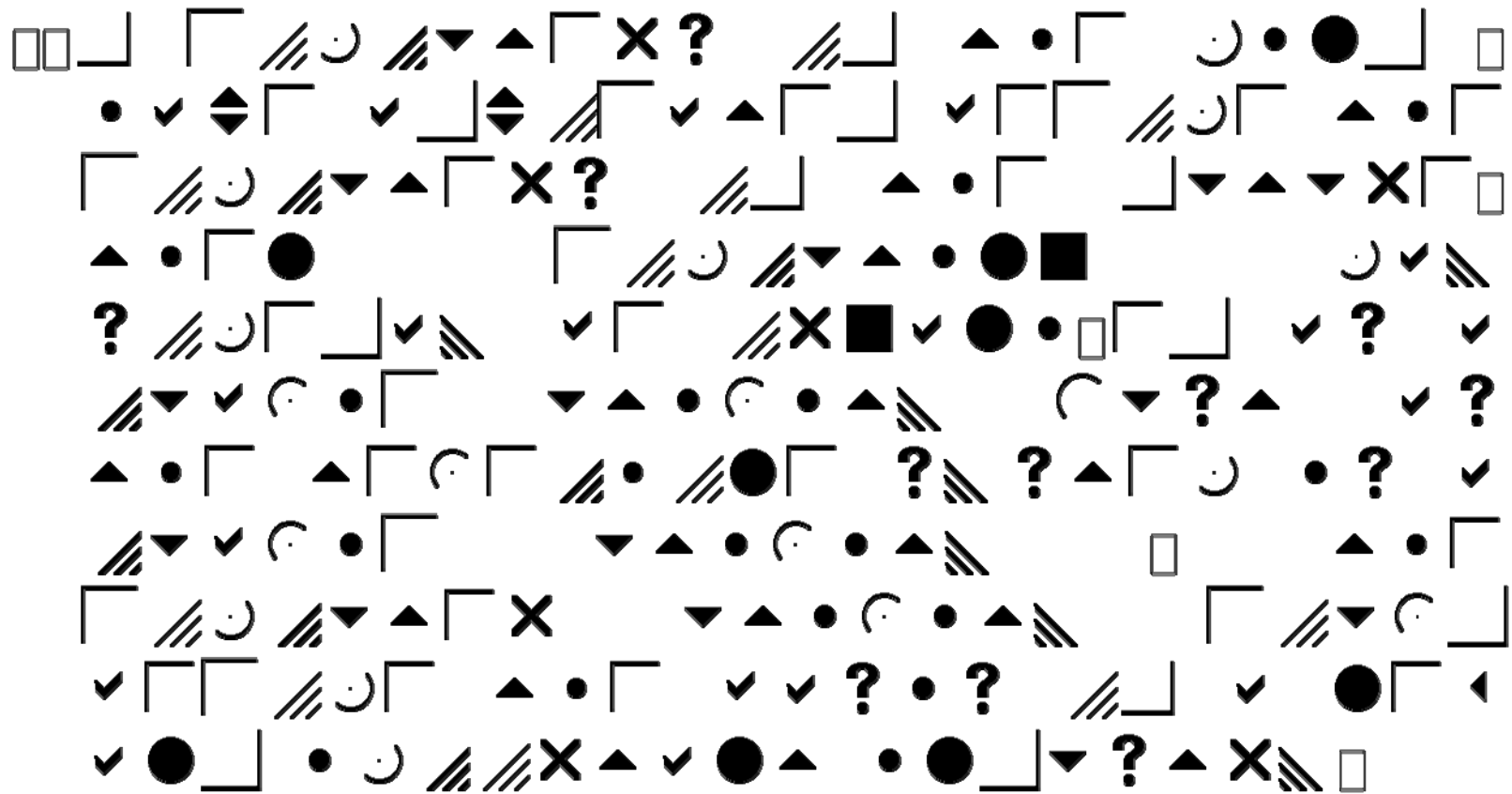


# Cloud Computing: Changing the Way We 'Do' Software



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John McCarthy, 1961

Optimize tomorrow today.™

# Agenda

- Introduction
- Cloud Computing
- Benefits
- Risks and Challenges
- Cost Considerations
- Impacts
- Examples and Findings
- Conclusions



# Introduction

- Cloud computing is a paradigm that opens the door for utility computing
- Instead of investing in hardware, software and infrastructure, organizations can access through the cloud on an as-needed basis
- Still lots of hype – some vendors have their head further in the clouds than their technology
- It's a notion that's gaining traction rapidly
  - Gartner predicts that one in 5 businesses will not own its own IT assets by 2012
  - Office of Management and Budget (OMB) under direction of the White House has instructed federal agencies that starting in 2012 they are expected to consider 'cloud first' for IT initiatives whenever it makes sense
  - Survey conducted for SafeGov.org in Sept 2011 finds federal agencies working diligently yet cautiously towards cloud computing.

# You are probably already a cloud consumer!



twitter



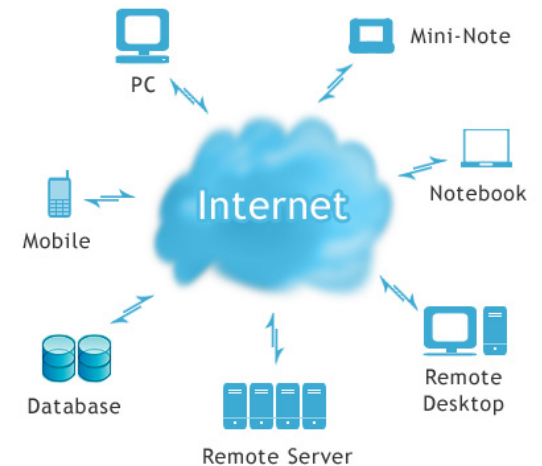
# Cloud Computing

- Consumers of cloud computing access hardware, software and networking capabilities from third party providers
- The cloud can be defined as resources and applications that are available on the Internet or other network via any device that connects to the Internet or other network
- According to National Institute of Standards and Technology (NIST), cloud computing delivers the following...
  - On demand self service
  - Ubiquitous network access
  - Location independent resource pooling
  - Rapid elasticity
  - Measured services



# Cloud Computing

- Cloud computing providers offer Internet connected servers which house applications and can store data
- Capabilities provided include
  - Content management
  - Database
  - Communication infrastructure
- Virtualization and scaling automated
- Control and access through Application Program Interfaces (APIs) or web services



# Cloud Computing

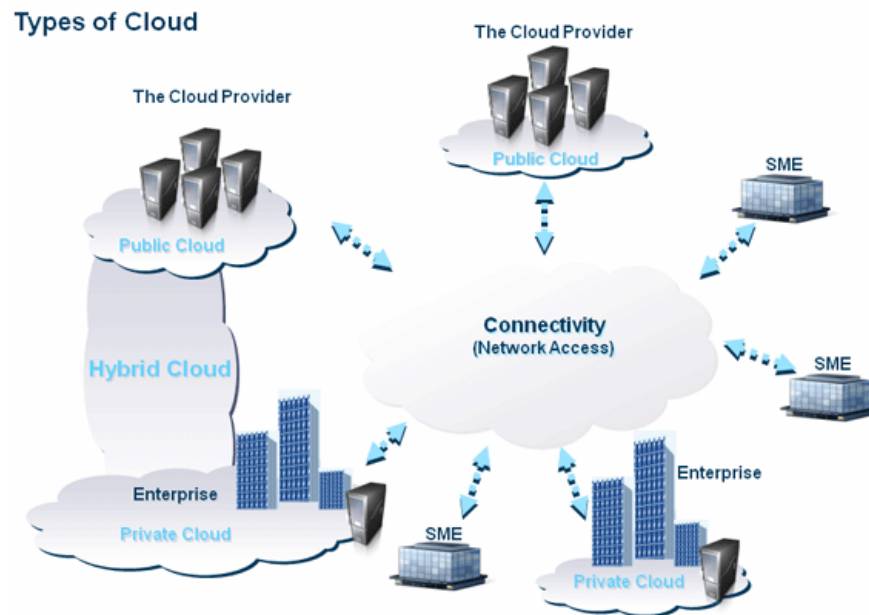
- Four types of clouds

- Public cloud

- Private cloud

- Community cloud

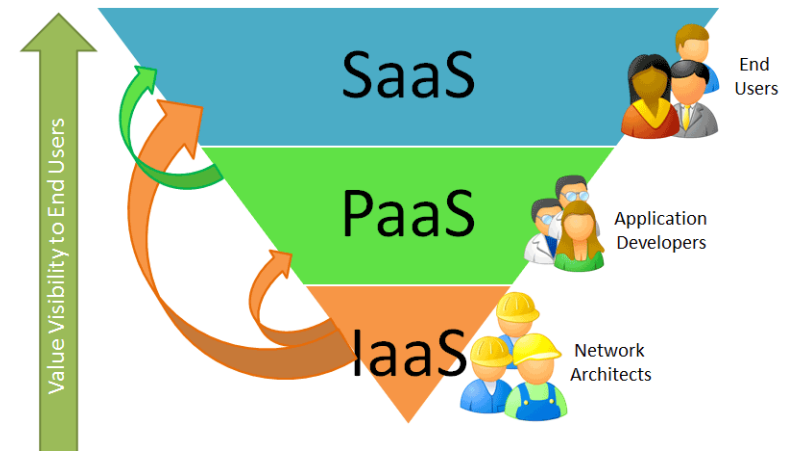
- Hybrid cloud





# Cloud Computing

- Cloud computing offerings include
  - Software as a Service (SaaS)
    - Project management
    - Customer Relationship Management (CRM)
    - Human Resources (HR)
  - Platform as a Service (PaaS)
    - Database
    - Development and Testing
    - Business Intelligence
  - Infrastructure as a Service (IaaS)
    - Backup and Recovery
    - Storage
    - Computation



# Cloud Computing

- Benefits
  - Cost savings
  - Agility
  - Scalability
  - On demand availability
  - Portability
  - Reduced harm to the real clouds
- Risks and challenges
  - Security
  - Reliability
  - Loss of Control
  - Vendor lock in



Study conducted by Deloitte 2010



# Cost considerations

- When evaluating cost benefits for a cloud migration the following things should be considered



- Operational costs as a function of amount of capability and data being moved to the cloud
- Migration costs based on the complexity based on the nature of the capability and the volume of data being migrated
- Equipment and licensing that can be eliminated
- Organizations current level of efficiency of operations
- Type of cloud
- Requirements for security
- Organizational and culture considerations

## Examples and Findings



- Zynga – developer of Farmville and other popular games
  - “If Farmville was a country it would be the fifth largest in the world”
  - 5 new players sign up for Zynga games every second!
- Significant need for on demand, scalable computer resources
- First used dedicated IT infrastructure – quickly became ineffective
- Moved to Amazon Web Services (AWS)
- Moved to a hybrid solution with a private cloud complemented by AWS.

# Examples and Findings

- Los Alamos National Laboratories

- The Challenge

Rollout of new projects – it could take as much as 30 days to provision servers for a project.

- The Solution

- On demand architecture with virtualization
- Private cloud since security was an issue
- Microsoft © SharePoint for cloud workflows and integration point
- VMWare© vCloud Director to manage and operate cloud
- VMWare© vShield for security

- The Results

- Servers can be provisioned in 30 minutes
- Virtualization made it possible to eliminate hardware
- They predict eventual savings to be \$1.3 M



# Examples and Findings

- Defense Information Systems Agency (DISA)

- The Challenge

Implementation of new software and systems at the DoD was expensive, time consuming and conducted in an environment not conducive to cross collaborate and ubiquitous delivery

- The Solution

- Created Forge.mil which provides tools and services for rapid development, testing and deployment of software to entire DoD
- CollabNet provides software development platform that facilitate reuse and collaboration for Forge.mil's 5000 users

- The Results

- DISA estimates that Forge.mil saves between \$200,000 and \$500,000 per project



## Examples and Findings

- US Federal Government 's website USA.gov
  - The Challenge

Access to this website ebbs and flows dramatically based on conditions in the country and the world
  - The Solution
    - GSA moved USA.gov to Terremark's Enterprise Cloud service
  - The Results
    - Site upgrade time went from nine months to one day
    - Monthly down time went from 2 hours to near 0 (99.99% availability)
    - Total annual cost of \$650,000 resulting in a 72% cost savings over the legacy USA.gov operational and personnel costs.



# Impacts of Cloud Computing

- Many predict cloud computing will be as big as the Internet with respect to impacts on society
  - Democratization of Data
  - Big Data analysis
  - Mobile cloud computing
  - Shifting job market
  - Level the playing field
  - How we educate and what we need to learn



# Conclusions

- Cloud computing offers individuals, businesses and federal agencies an alternative to meeting their IT needs with in-house resources
- Cloud providers promise many benefits and there is evidence that these benefits exist and are realizable
- Benefits include cost reduction, increased availability, reduced waste, scalability and virtualization
- There are also concerns as the technology is still immature and issues such as security, standards and portability need to be address
- The cloud has the potential to change the way we do business.



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