

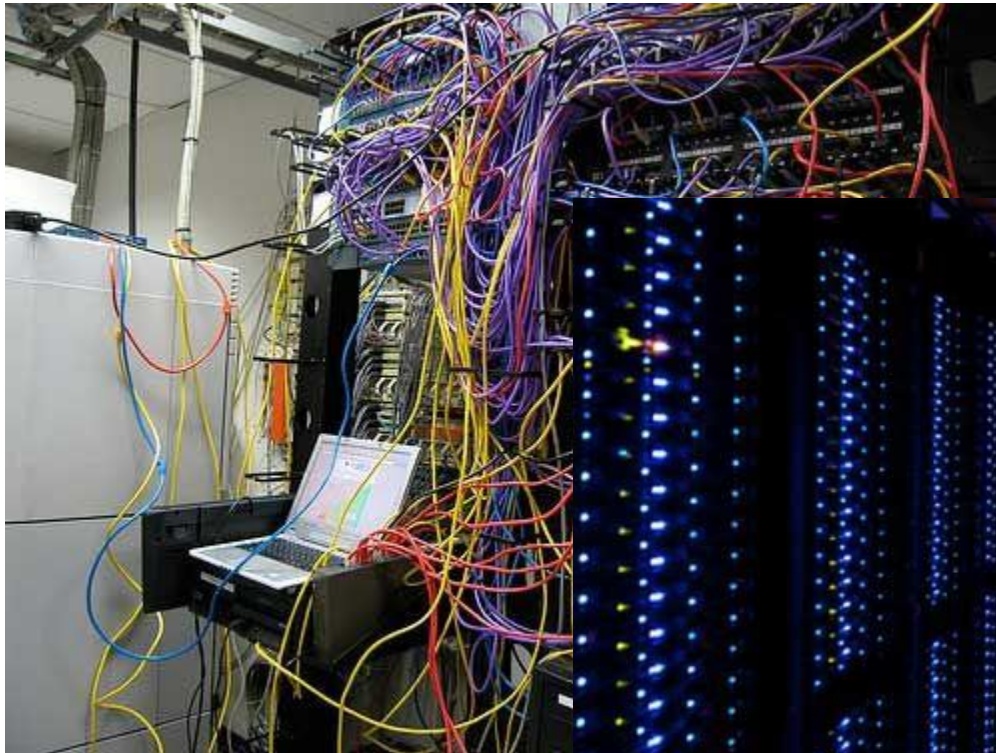
Introduction to Cloud Computing



- What is Cloud Computing?
- Characteristics of the Cloud Computing model
- Evolution of Cloud Computing
- Cloud Computing Architecture
- Cloud Services: IaaS, PaaS, SaaS
- Pros and Cons
- Public Clouds and related resources

IT Infrastructure

In the past



Today



What is Cloud Computing?

NIST Definition

“A model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

On-Demand Self-Service

- On-demand – when the consumer wants it.
- Self-service - Consumer performs all the actions to acquire the service.
- Automation - Requests are automatically processed, without human intervention on the provider's side.



Broad Network Access

- Consumers are physically separated from the computing capabilities
- Those capabilities must be available over a network, and
- Accessed through standard mechanisms and devices.



Resource Pooling

- Resources are shared
- Multi-tenancy – different physical and virtual resources can be assigned and re-assigned according to demand
- Generally no knowledge of or control over location



Rapid Elasticity

- Elasticity – the new scalability
- Capabilities can be provisioned or released to rapidly scale with demand.
- To the consumer the capabilities often appear to be essentially limitless.
- Can be added in any quantity at any time.

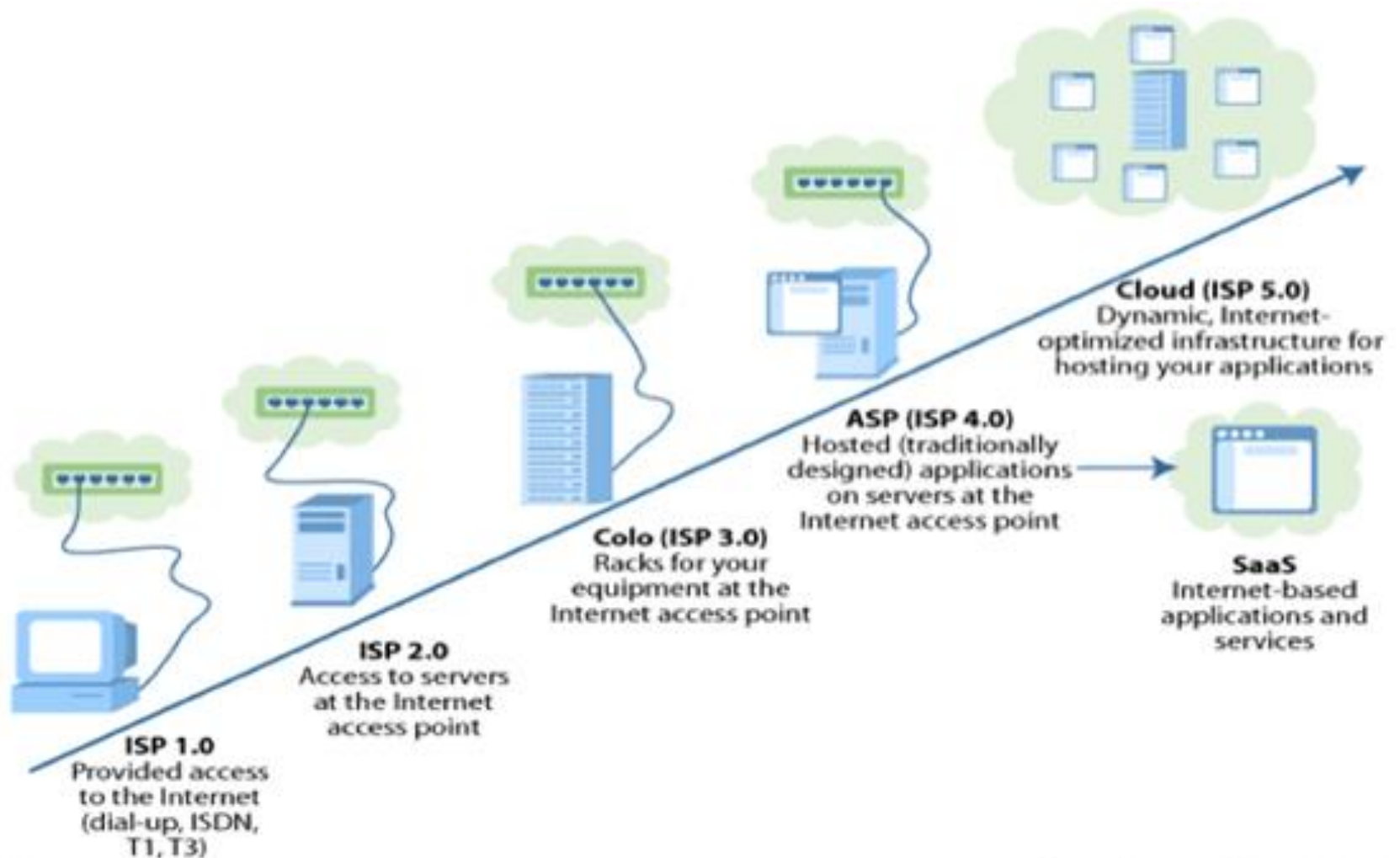


Measured Service

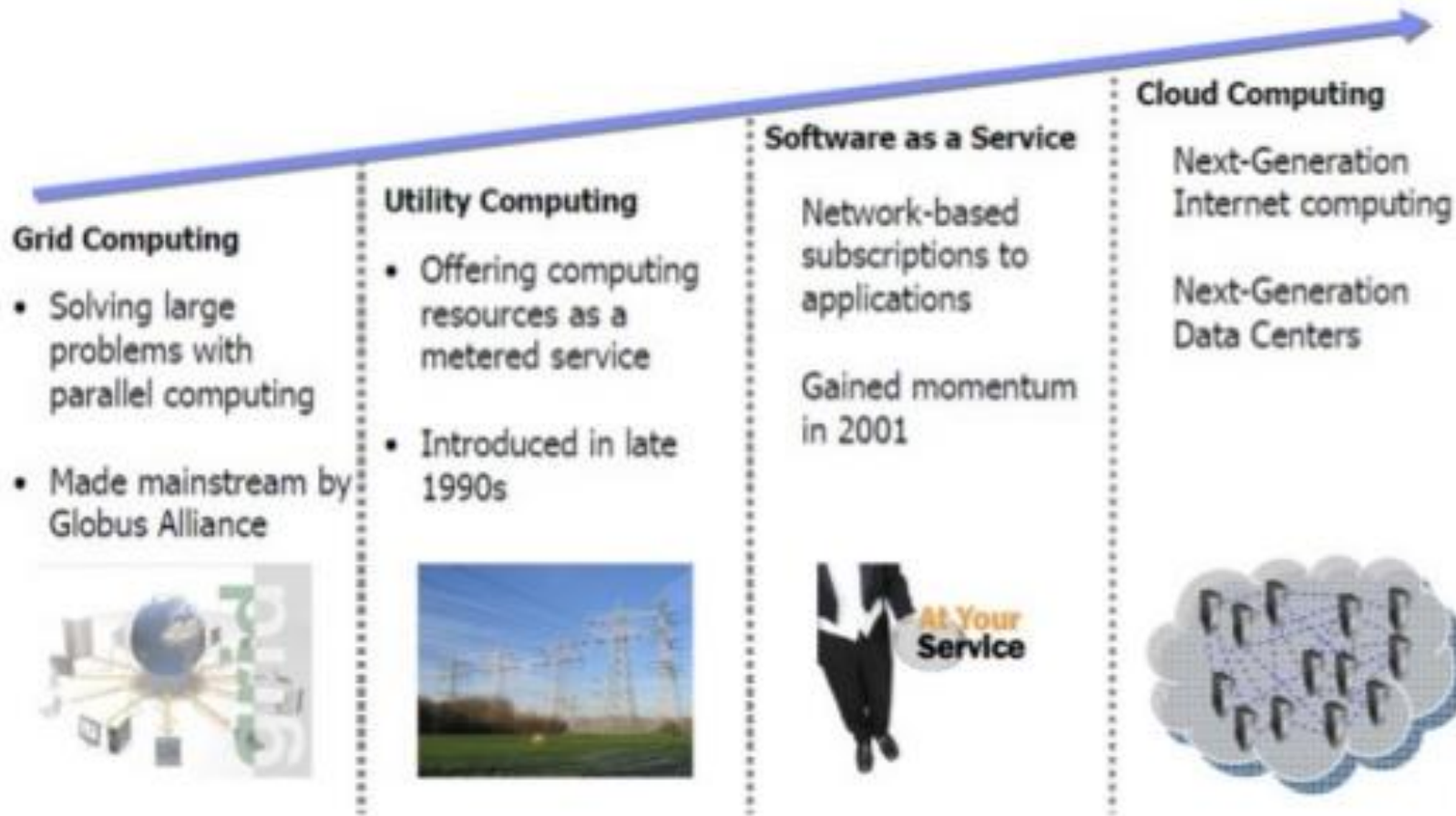
- Resource use is automatically controlled and optimized by leveraging a metering capability.
- Typically on a pay-per-use basis
- Usage can be monitored controlled and reported.



History



Evolution of Cloud Computing



Evolution of Cloud Services



Components of the Cloud

- Front-end (regular desktop, thin client, mobile device)
- Back-end (servers)
- Storage / Datacenters
- Delivery Service
(SaaS, PaaS, IaaS)



Service Models (SaaS)

- SaaS – Software as a Service

Network hosted application; consumers purchase the ability to access and use the application; consumer cannot manage or control the underlying cloud infrastructure

- Examples

- Google Apps
- Salesforce CRM

- PaaS – Platform as a Service

Consumer has the ability to deploy their own applications onto the cloud infrastructure; consumer cannot manage or control the underlying cloud infrastructure

- Examples

- Google App Engine
- IBM Bluemix
- Force.com (SalesForce Dev Platform)

Service Models (IaaS)

- IaaS – Infrastructure as a Service

Consumers has the ability to provision processing, storage, networks, and other fundamental computing resources; consumer cannot manage or control the underlying cloud infrastructure but can control the operating systems, storage and deployed applications

- Examples

- Amazon EC2

More Service Models

- DaaS – Data as a Service

Consumer queries against provider's database

- NaaS – Network as a Service

Provider offers virtualized networks (e.g. VPNs)



Deployment Models

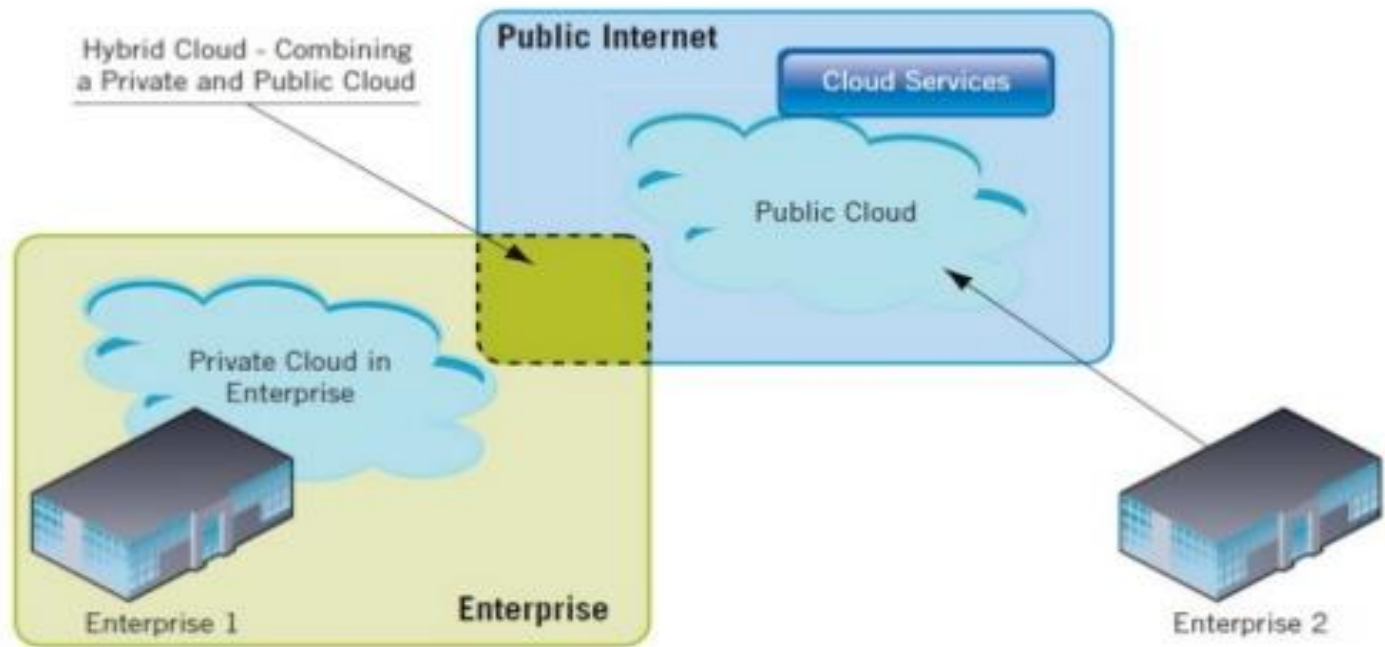
- Public Cloud

Cloud infrastructure is provisioned for open use by the general public.

- Private Cloud

Cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (business units)

Deployment Models



Public, Private, and Hybrid Cloud Deployment Example

Deployment Models

- Community Cloud

Cloud infrastructure is provisioned for exclusive use by a specific community of consumers

- Hybrid Cloud

Cloud infrastructure is a composition of two or more distinct cloud infrastructures (public, private, or community)

Advantages of Cloud Computing

- SaaS – easy consumer adoption
- PaaS – good for developers
- IaaS – complete control of environment and infrastructure

Disadvantages of Cloud Computing

- SaaS – limited functionality, no control or access to underlying technology
- PaaS – restricted to whatever is available on the platform and other dependencies
- IaaS - expensive

- Cost-saving
- Scalability, Flexibility, reliability
- Ongoing maintenance

- Security and privacy
- Lack of standards
- Continuously evolving

“Computing is turning into a utility, and the effects of this transition will ultimately change society as completely as the advent of cheap electricity did.”

- The Big Switch by Nicholas Carr