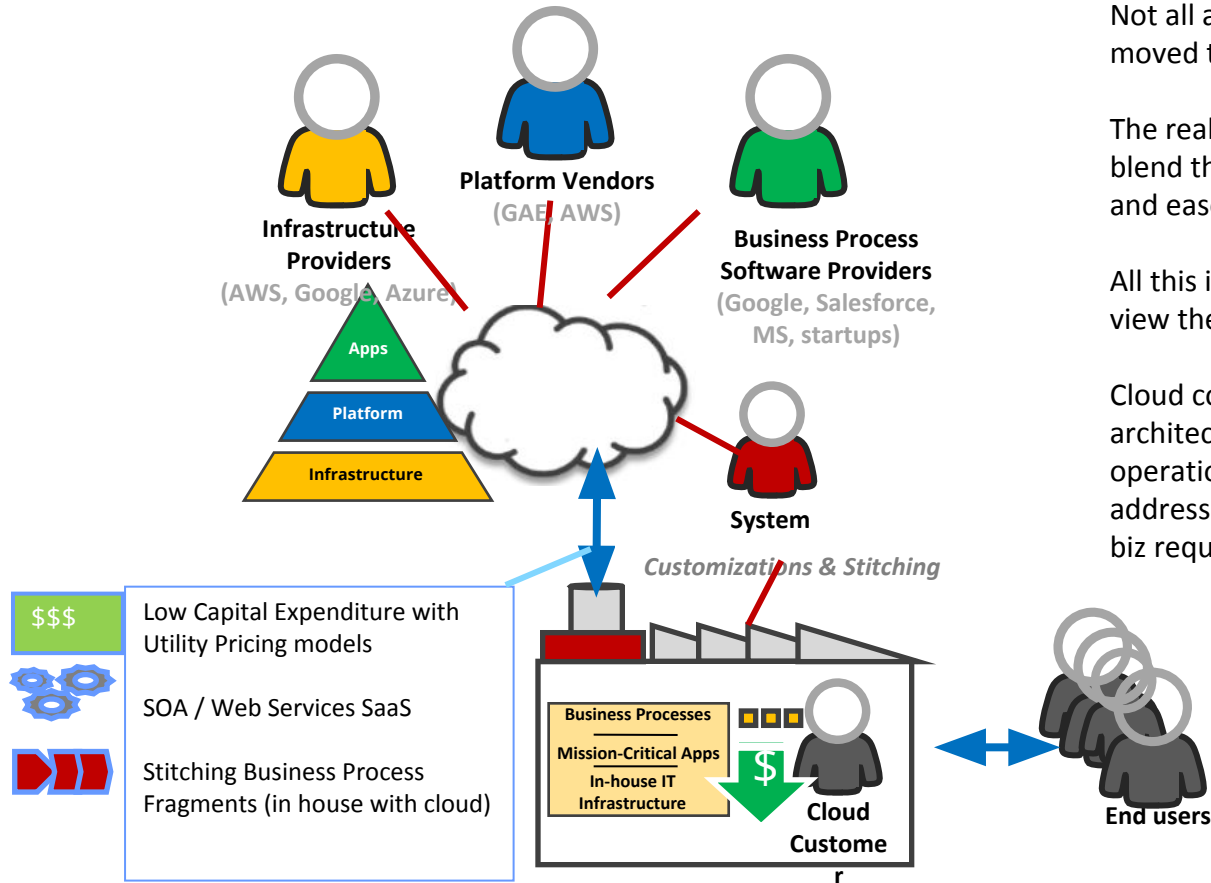There is nothing called as
"Cloud computing"

It's someone else's computer in their
datacenter!

# Our focus

Not all applications can be or should be moved to the cloud.

The real success is to have the right blend that results in business benefits and ease in technology.

All this is to be considered keeping in view the organization's growth roadmap.

Cloud computing is for business leaders, architects, application designers & operations teams who are looking to address "End users" (or organizations) biz requirements!

**Platform Vendors**
**(GAE, AWS)**

**Infrastructure Providers**
**(AWS, Google, Azure)**

**Business Process Software Providers**
**(Google, Salesforce, MS, startups)**

Apps

Platform

Infrastructure

**System**

*Customizations & Stitching*

$$$
Low Capital Expenditure with Utility Pricing models

SOA / Web Services SaaS

Stitching Business Process Fragments (in house with cloud)

Business Processes
Mission-Critical Apps
In-house IT Infrastructure

$

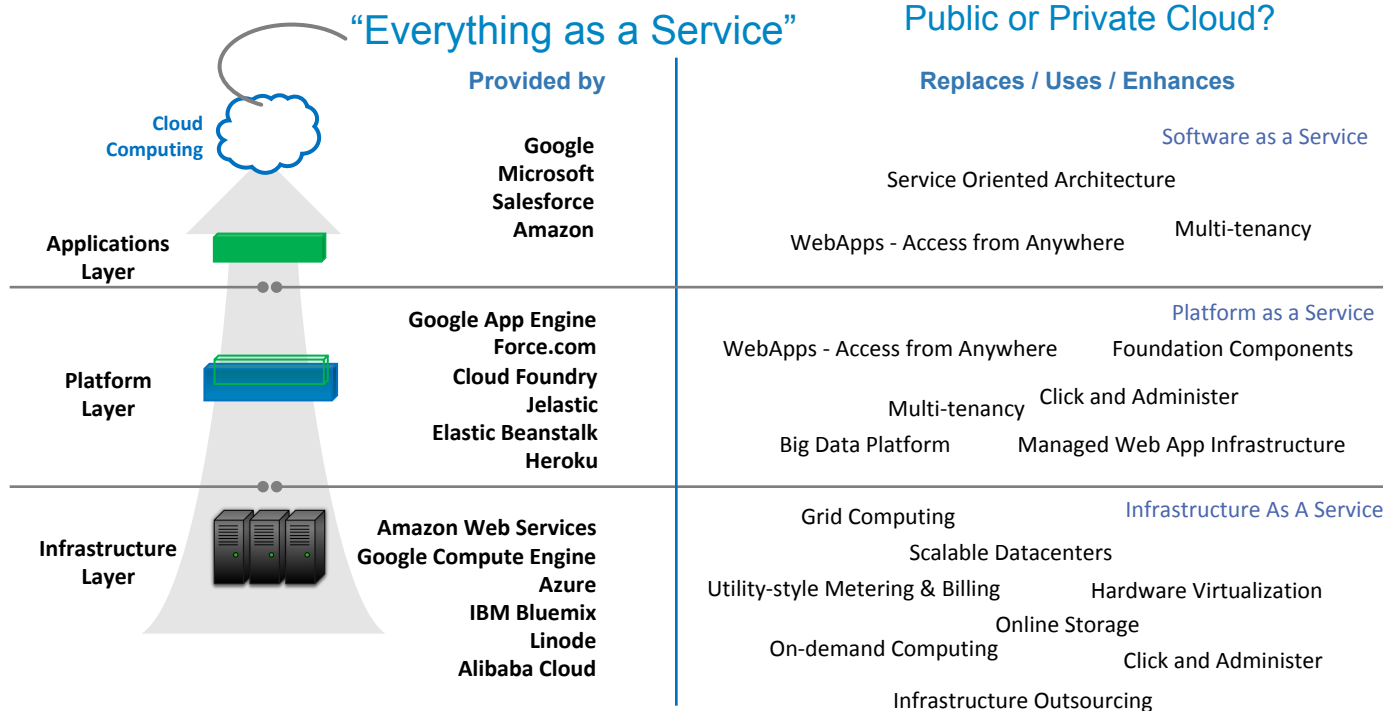**Cloud Customer**

**End users**

2

# Any definitions?

- Style of computing in which **massively scalable** IT related capabilities are provided "**as a service**" using internet technologies to multiple **"external customers" –** *Gartner*

- Pool of abstracted, **highly scalable**, and managed compute infrastructure capable of hosting end-customer applications and **billed by consumption – ** *Forrester*

# Myths of cloud computing

- There's one single "Cloud"
- All you need is your credit card
- The cloud always saves you money
- The cloud always reduces your workload
- Integration (two versions)
  - You can seamlessly blend your private "Cloud" (your virtualized datacenters) with public providers
  - You won't ever be able to seamlessly blend your public and private clouds
- A cloud provider can guarantee security
- If you are using virtualization, you are doing cloud computing
- Cloud computing is only about technology

# Service delivery models

Gartner: a style of computing where massively scalable IT-enabled capabilities are delivered 'as a service' to external customers using Internet technologies.
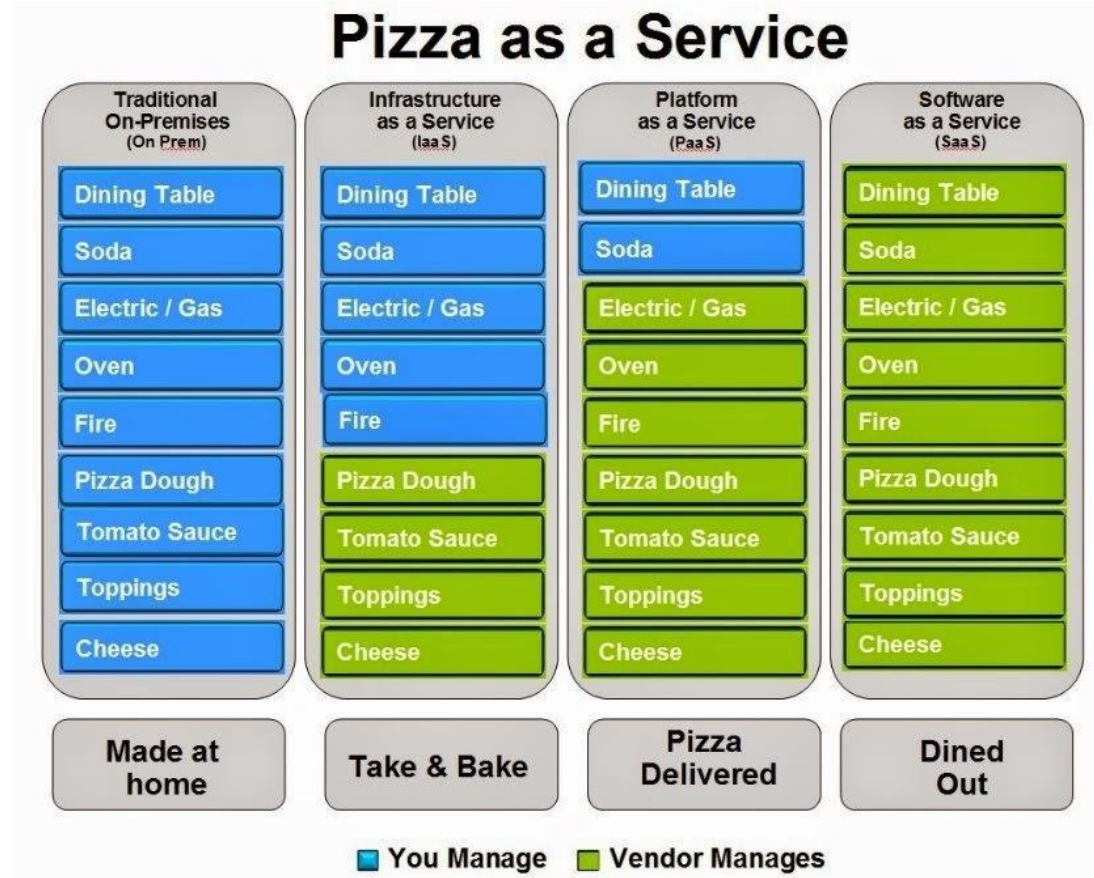
## "Everything as a Service"

### Public or Private Cloud?

**Provided by**

**Replaces / Uses / Enhances**

Cloud Computing

**Applications Layer**

Google
Microsoft
Salesforce
Amazon

Software as a Service

Service Oriented Architecture

WebApps - Access from Anywhere

Multi-tenancy

**Platform Layer**

Google App Engine
Force.com
Cloud Foundry
Jelastic
Elastic Beanstalk
Heroku

Platform as a Service

WebApps - Access from Anywhere    Foundation Components

Multi-tenancy    Click and Administer

Big Data Platform    Managed Web App Infrastructure

**Infrastructure Layer**

Amazon Web Services
Google Compute Engine
Azure
IBM Bluemix
Linode
Alibaba Cloud

Infrastructure As A Service

Grid Computing

Scalable Datacenters

Utility-style Metering & Billing    Hardware Virtualization

Online Storage

On-demand Computing    Click and Administer

Infrastructure Outsourcing

# Cloud providers comparison

**greatlearning**

Figure 1. Magic Quadrant for Cloud Infrastructure as a Service, Worldwide



Source: Gartner (June 2017)
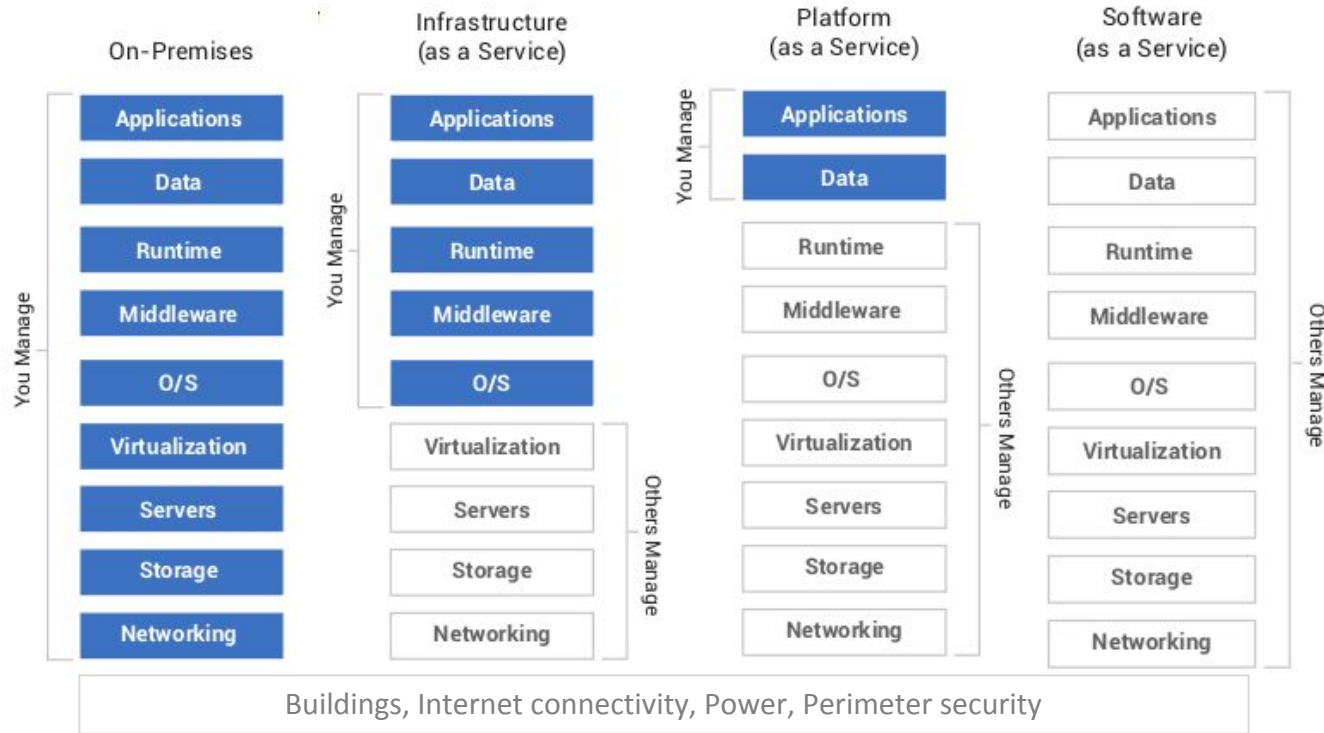
- http://www.infoworld.com/article/3150205/cloud-computing/cloud-compute-aws-azure-google-softlayer-compared.html

- http://www.infoworld.com/article/3132023/security/10-aws-security-blunders-and-how-to-avoid-them.html#tk.drr_mlt

# A perspective



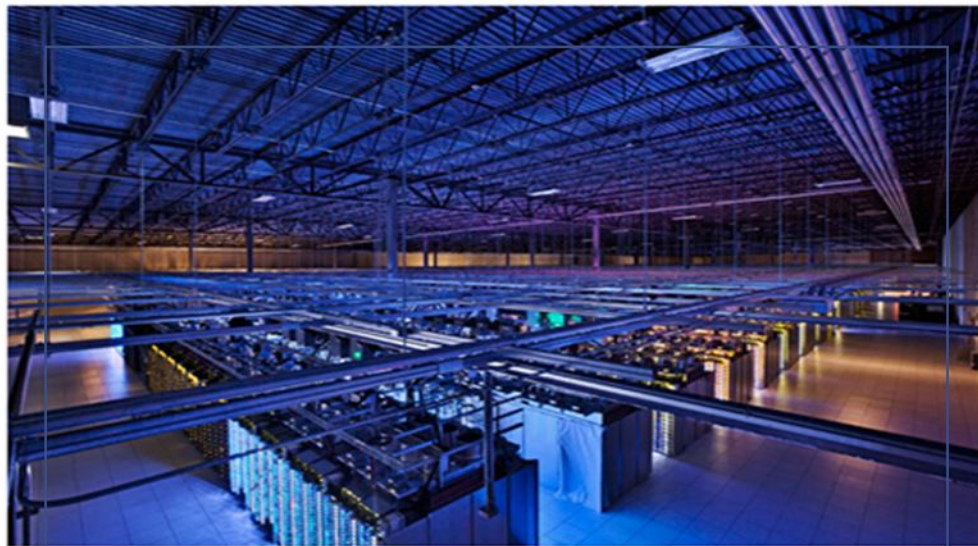**Pizza as a Service**

| Traditional On-Premises (On Prem) | Infrastructure as a Service (IaaS) | Platform as a Service (PaaS) | Software as a Service (SaaS) |
|---|---|---|---|
| Dining Table | Dining Table | Dining Table | Dining Table |
| Soda | Soda | Soda | Soda |
| Electric / Gas | Electric / Gas | Electric / Gas | Electric / Gas |
| Oven | Oven | Oven | Oven |
| Fire | Fire | Fire | Fire |
| Pizza Dough | Pizza Dough | Pizza Dough | Pizza Dough |
| Tomato Sauce | Tomato Sauce | Tomato Sauce | Tomato Sauce |
| Toppings | Toppings | Toppings | Toppings |
| Cheese | Cheese | Cheese | Cheese |
| Made at home | Take & Bake | Pizza Delivered | Dined Out |

■ You Manage   ■ Vendor Manages

# Degree of abstraction - app view

# Where are these things coming from?

A central cooling plant in Google's Douglas County, Georgia, data center.
Photo: Google/Connie Zhou



A server room in Council Bluffs, Iowa.
Photo: Google/Connie Zhou
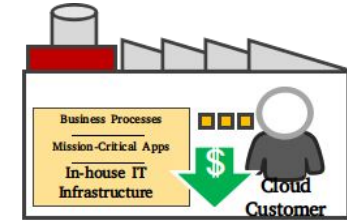
# The classical enterprise
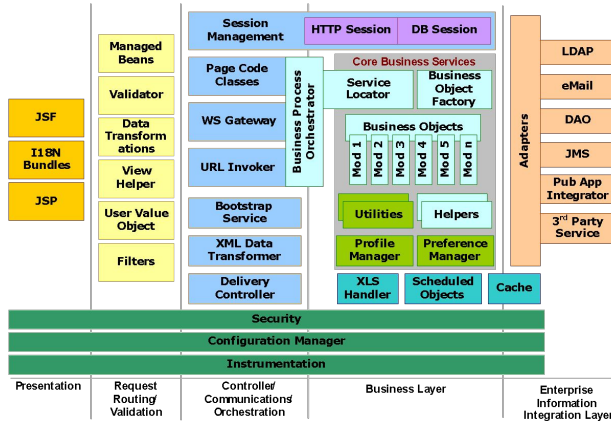
Monolith Web application - all components are bundled together as a single deployable/application



1. Portals
2. Search
3. Content management
4. Middleware/ESB
5. BPM
6. Database farm
7. Warehousing
8. ETL processes
9. BI/Reporting
10. CSR product
11. ERP product
12. Contact center product
13. Infra monitoring tools
14. Code repo/CI/CD tools
15. Productivity/Office/Collaboration tools
16. Operating systems
17. Virtualization software
18. Infrastructure h/w (machines, routers)
19. Networking (h/w firewalls, load balancers)
20. Buildings & perimeter security
21. Electricity (primary, secondary)/Cooling/Land



**+**

1. Human expertise & capital
2. Ongoing process of patches & upgrades
3. Procurement department, many 3rd party vendors
4. Dissonant operations/ownership
5. Utilization challanges & capacity guesswork
6. Various licensing (fixed + incremental) & AMC
7. Capital expenses & depreciating assets
8. Disconnected ops expenses from top line
9. Some intangibles like "stress" too!

10

# Why cloud?

Python/Java/C++ looks & runs nice on the cloud

**OR**

$\text{UserHours}_{cloud} \times (\text{Revenue} - \text{Cost}_{cloud}) \geq \text{UserHours}_{datacenter} \times [\text{Revenue} - (\text{Cost}_{datacenter} / \text{Utilization})]$

The left-hand side multiplies the net revenue per user-hour by the number of user-hours, giving the expected profit from using Cloud Computing.

The right-hand side performs the same calculation for a fixed-capacity datacenter by factoring in the average utilization, including nonpeak workloads, of the datacenter.

**Whichever side is greater represents the opportunity for higher profit.**

# Cloud computing attributes

**Choice of provider** - Based on business need and partnership models. Market competition is good for consumers as it avoids monopoly

**Agility, OnDemand, Self service** - Procurement latency is no longer a barrier

**Resource pooling** - leverage economies of scale for cost reduction

**Admin & Monitoring** - being proactive is better than reactive

**Resilient, Elastic & Subscription** - build architecture to sustain failures, no need to plan infrastructure ahead of time based on speculation & convert capex to opex

**Core data center services** - Compute, Storage & Networking, focus more on business rather than data center operations

**Managed services** - hosted managed services allow developers to focus on core applications with business logic, support services become an API call
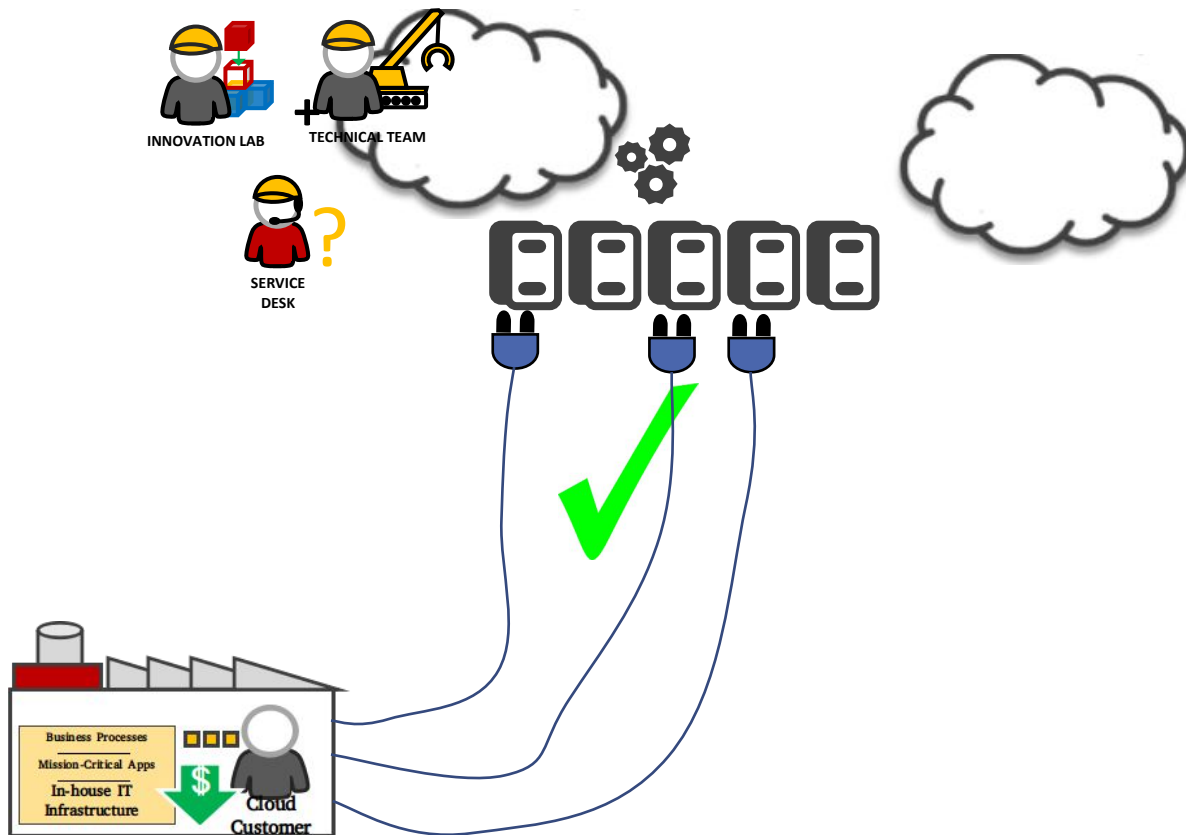
# Hosted managed services

1. Portals
2. Search
3. Content management
4. Middleware/ESB
5. BPM
6. Database farm
7. Warehousing
8. ETL processes
9. BI/Reporting
10. CSR product
11. ERP product
12. Contact center product
13. Infra monitoring tools
14. Code repo/CI/CD tools
15. Productivity/Office/Collaboration tools
16. Operating systems
17. Virtualization software
18. Infrastructure h/w (machines, routers)
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INNOVATION LAB  TECHNICAL TEAM

SERVICE DESK

Business Processes
Mission-Critical Apps
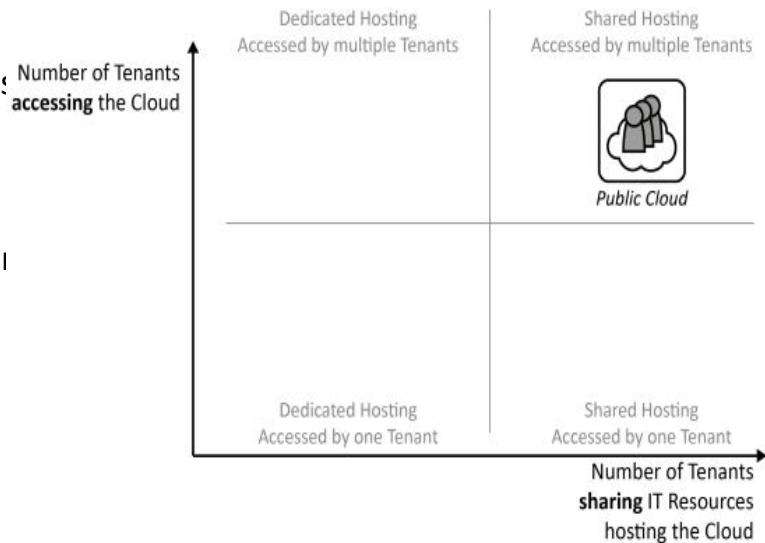In-house IT Infrastructure
Cloud Customer

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# Cloud storage as a service



"Are you sure this is how we upload data into the Cloud?"
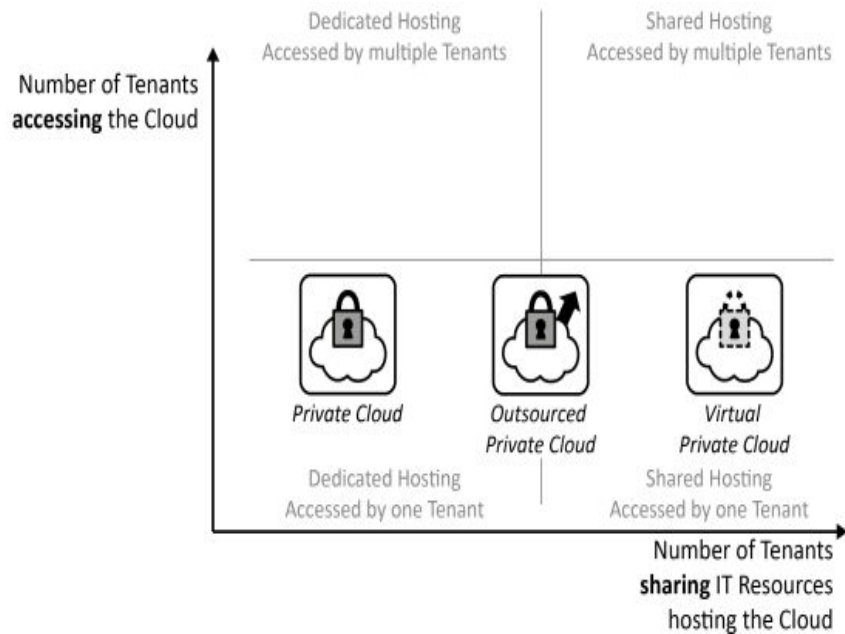
# Cloud deployment models - Public

- A model where a service provider makes resources, such as applications and storage, available to the general public over the internet

- The hosting environment is shared between many customers, possibly reducing the costs for an individual customer

- Leveraging economies of scale enables a dynamic use of resources, because workload peaks of some customers occur during times of low workload of other customers

- It is hosted and managed by a 3rd party from one or more data centers

- What does this mean about a customer's data?

Number of Tenants **accessing** the Cloud

Dedicated Hosting
Accessed by multiple Tenants

Shared Hosting
Accessed by multiple Tenants

Public Cloud

Dedicated Hosting
Accessed by one Tenant

Shared Hosting
Accessed by one Tenant

Number of Tenants **sharing** IT Resources hosting the Cloud
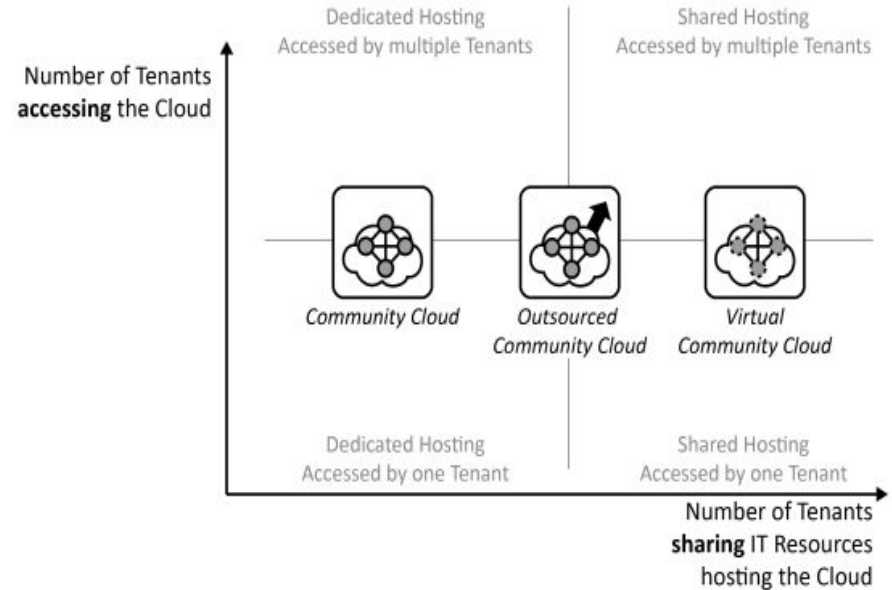
# Cloud deployment models - Private

- Cloud computing properties are enabled in a company-internal data center

- Alternatively, the Private Cloud may be hosted exclusively in the data center of an external provider, then referred to as outsourced Private Cloud

- Public Cloud providers also offer means to create an isolated portion of their cloud made accessible to only one customer: a Virtual Private Cloud (aka Private Networking) which is the default behavior for many public cloud providers

Dedicated Hosting
Accessed by multiple Tenants

Shared Hosting
Accessed by multiple Tenants

Number of Tenants **accessing** the Cloud

Private Cloud

Outsourced Private Cloud

Virtual Private Cloud

Dedicated Hosting
Accessed by one Tenant

Shared Hosting
Accessed by one Tenant

Number of Tenants **sharing** IT Resources hosting the Cloud

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# Cloud deployment models - Community

- IT resources required by all collaborating partners are offered in a controlled environment accessible only by the community of companies that generally trust each other

- Carving out a dedicated area exclusively for a company could be possible (private)

- A similar model to that of ASP, completely managed by a 3rd party (outsourced)

Dedicated Hosting
Accessed by multiple Tenants

Shared Hosting
Accessed by multiple Tenants

Number of Tenants
**accessing** the Cloud

Community Cloud

Outsourced
Community Cloud

Virtual
Community Cloud

Dedicated Hosting
Accessed by one Tenant

Shared Hosting
Accessed by one Tenant

Number of Tenants
**sharing** IT Resources
hosting the Cloud

# Cloud deployment models - Hybrid

- Any combination of Public, Private & Community

- E.g. any cloud (one or more) along with any static in-house data center (one or more) are integrated

- Applications can choose the right environment leveraging the best from each option

- Enabled in "Cloud bursting"

- Interconnecting usually happens via VPN