Internet of Things

Technologies related to IoT: Cloud computing

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CONTENT

1. Cloud Computing
2. Benefits of Cloud Computing
    1. Cost
    2. Velocity
    3. Global scale
    4. Productivity
    5. Performance
    6. Reliability
    7. Safety
3. Cloud Computing Models (Architecture)
4. Types of Cloud Computing

Cloud Computing

- Provision of computer services:
  - servers,
  - storage,
  - data base,
  - network,
  - software,
  - analysis and intelligence
- Through the Internet ("the cloud")

- Make available faster:
  - innovation,
  - flexible features
  - design savings.
    - you only pay for the cloud services you use
      - reduce operating costs
      - run the infrastructure more effectively
      - scale as the company needs to change.

Frequent terms
https://azure.microsoft.com/pt-pt/overview/cloud-computing-dictionary/

Benefits of Cloud Computing

- Cost
- Velocity
- Global scale
- Productivity
- Performance
- Reliability
- Safety

Benefits: Cost

- Cut xpenses related to:
  - Purchase of hardware and software
  - Configuration and execution of local data centers
    - Server racks
    - Electricity 24h / 7d (energy and cooling)
    - IT specialists to manage the infrastructure

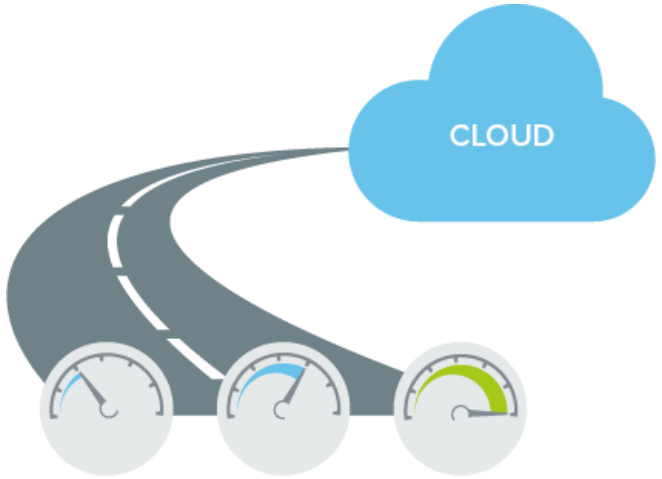
Curiosity
Coink – IoT piggy bank:
https://www.hackster.io/cojoteam/coink-an-iot-piggy-bank-6e3f83

- Price Comparison of IoT Platform Vendors (Jul 9, 2018):
https://medium.com/@iskerrett/price-comparison-of-iot-platform-vendors-b07ab4bbf0e

IoT:
- More predictable costs
  - Flexible plans based on actual use
  - No need to purchase and maintain hardware
    - Faults / malfunctions
    - Downtimes

Benefits: Speed

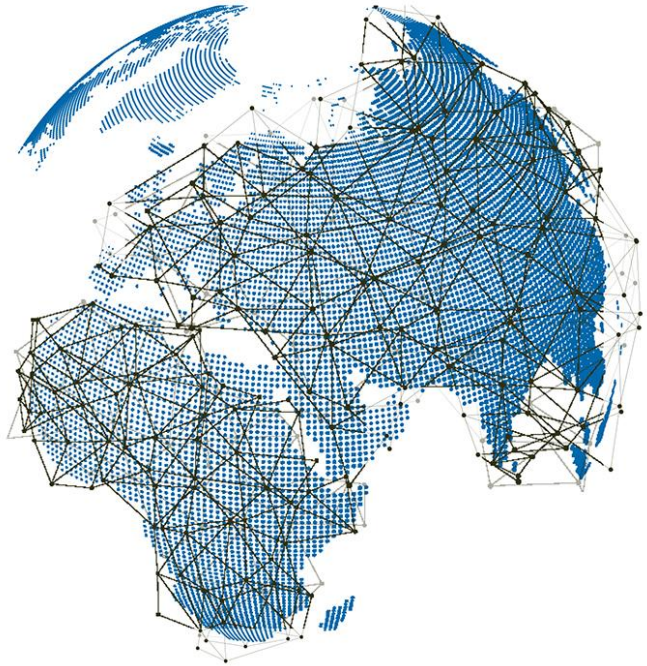
- Most services are provided as self-service and on request
- Huge amounts of computer resources can be obtained quickly and easily
- Provides flexibility to companies
- Removes companies from the pressure of capacity planning



IoT:
- Data volume and speed can be too much for a local infrastructure

Benefits: Scalability

- Most services are provided as self-service and on request
- Huge amounts of computer resources can be obtained quickly and easily
- Provides flexibility to companies
- Removes companies from the pressure of capacity planning



IoT:
- Adding hardware is easier: “request” another server

Benefits: Productivity

- Local datacenters demand:
  - hardware configuration,
  - software patching
  - other time-consuming IT management tasks.
- Cloud computing eliminates the need for many of these tasks
  - IT teams can dedicate more time to more important tasks.

IoT:
- Data mobility allows them to be accessed from any location, and not just on company premises

Benefits: Performance

- Largest cloud computing services:
  - Worldwide network of secure datacenters
    - Regularly updated to the latest generation of fast and efficient computer hardware.
- Multiple benefits over a single enterprise data center :
  - Reduced network latency for applications
  - Greater scalability.

IoT:
- More efficient processing due to the characteristics of the cloud, compared to local infrastructure

Benefits: Reliability

- The data can be mirrored in several redundant locations on the cloud provider's network.
- Makes it cheaper and easier:
  - Data backup copies
  - Fail recoveries
  - Business continuity

IoT:
- Easier implementation of copy, redundancy and data recovery mechanisms

Benefits: Security

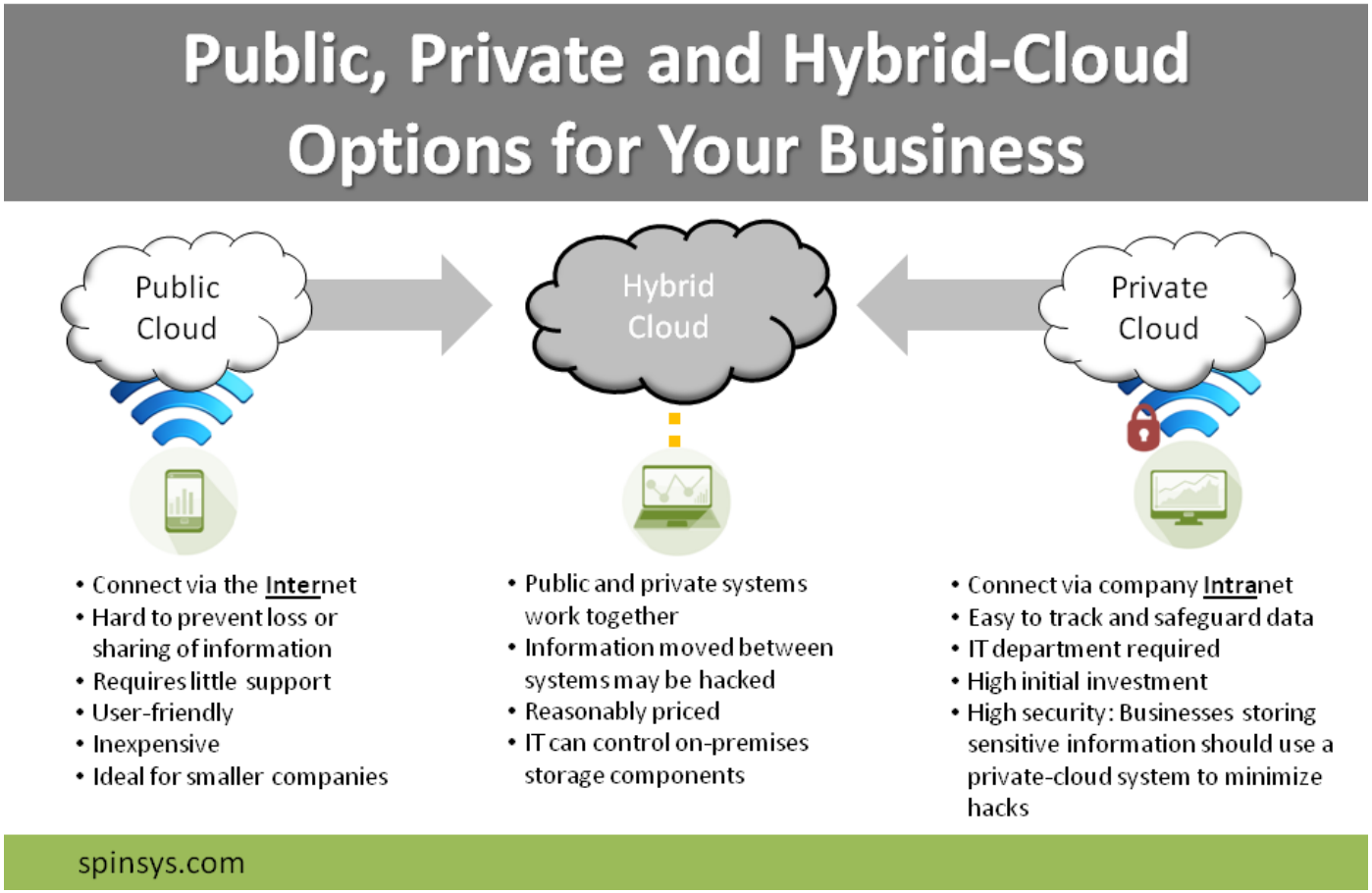
- Set of:
  - Policies
  - Technologies
  - Controls

- Strengthen security posture globally

- Helps protect against potential threats :
  - Data
  - Applications
  - Infrastructure

IoT:
- Agreement with cloud vendor to maintain security
- Some people may have reservations about giving third parties access to their IoT data (even the cloud provider)

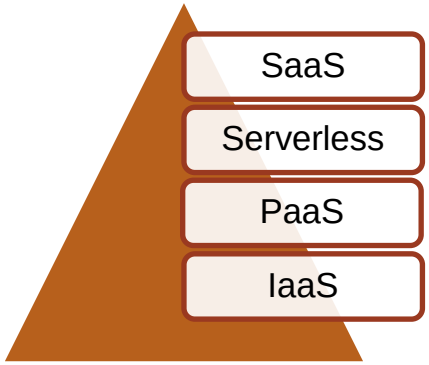
Cloud Computing Models (Architecture)



https://www.spinsys.com/2016/02/comparing-public-private-and-hybrid-clouds/

Types of Cloud Computing

Infrastructure as a Service (IaaS)
- Most basic category
- IT infrastructure is leased
  - Servers
  - Virtual machines (VMs)
  - Storage
  - Networks
  - Operating Systems



Platform as a Service (PaaS)
- Cloud computing services that provide an on-demand environment for :
  - Develop
  - Test
  - Provide
  - Manage software applications
- Enables developers to quickly create web or mobile applications
  - Without having to worry about configuring or managing the underlying infrastructure :
    - Servers
    - Storage
    - Network
    - Data base

Serverless
- Focuses on creating application functionality
- Without wasting time on continuous management of the necessary servers and infrastructure
- Cloud vendor handles servers :
  - Configuration
  - Planning
  - Management
- Highly scalable
- Event oriented
- Only use resources when a specific function or trigger occurs.

Software as a Service (SaaS)
- Provide software applications :
  - Through the Internet
  - Upon request and
  - According to a subscription model (generally).
- Cloud providers
  - Host and manage
    - Software application
    - Infrastructure
  - They are responsible for all maintenance
    - Software updates
    - Application of security patches
- Users connect to the application via the Internet

Types of Cloud Computing

https://www.eltallerdesharepoint.com/net/index.php/2017/06/introduccion-a-los-portales-de-azure-y-office-365/

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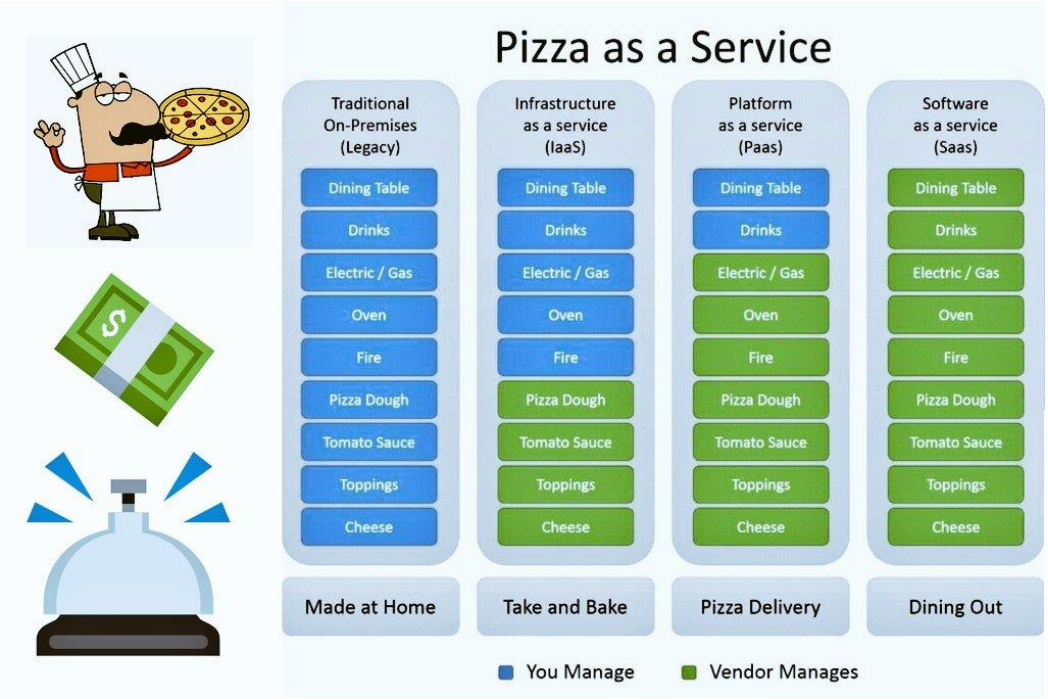

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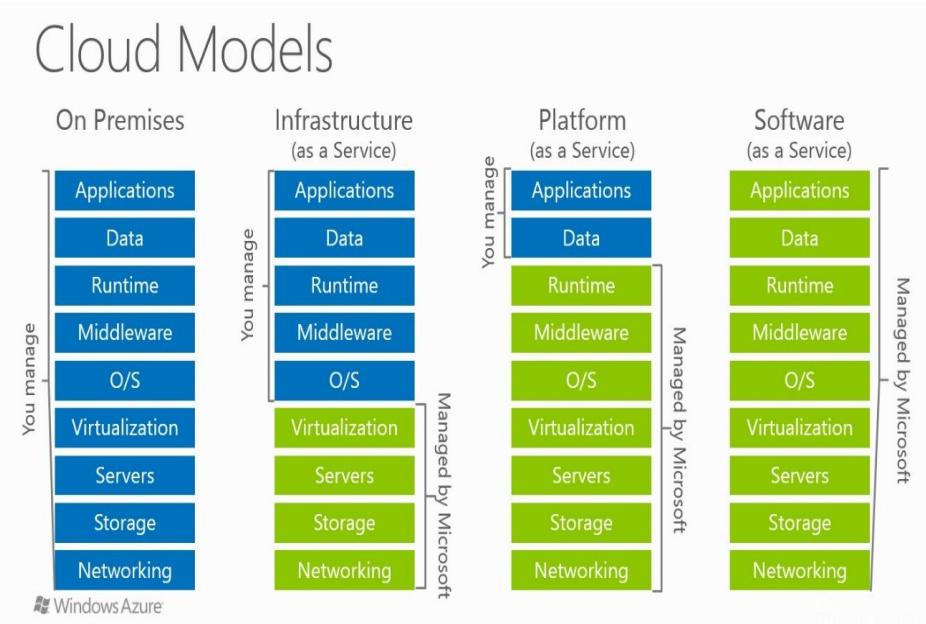

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