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**Cloud Computing:  
Bringing Elastic Computation to Your Datasets**

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# Everyone to The Cloud! Now! Hurry!



# To the cloud! Wait, the what?



COURTESY: MICROSOFT

# Cloud Computing is:

“**Cloud computing** is a [business AND technical] model for enabling convenient, **on-demand network access** [from ANY device...PC, Laptop/Tablet, SmartPhone] to a **shared pool of configurable computing resources** (e.g., networks, servers, storage, applications, and services) that can be **rapidly provisioned and released** with minimal management effort or service provider interaction.” -- **NIST**

# **NIST Cloud Definition & Characteristics**

<http://www.nist.gov/itl/cloud/index.cfm>

**On-Demand Self-Service**

**Broad Network Access**

**Resource Pooling**

**Rapid Elasticity**

**Measured Service**

**Delivered as:**

**SaaS (Software as a Service)**

**PaaS (Platform as a Service)**

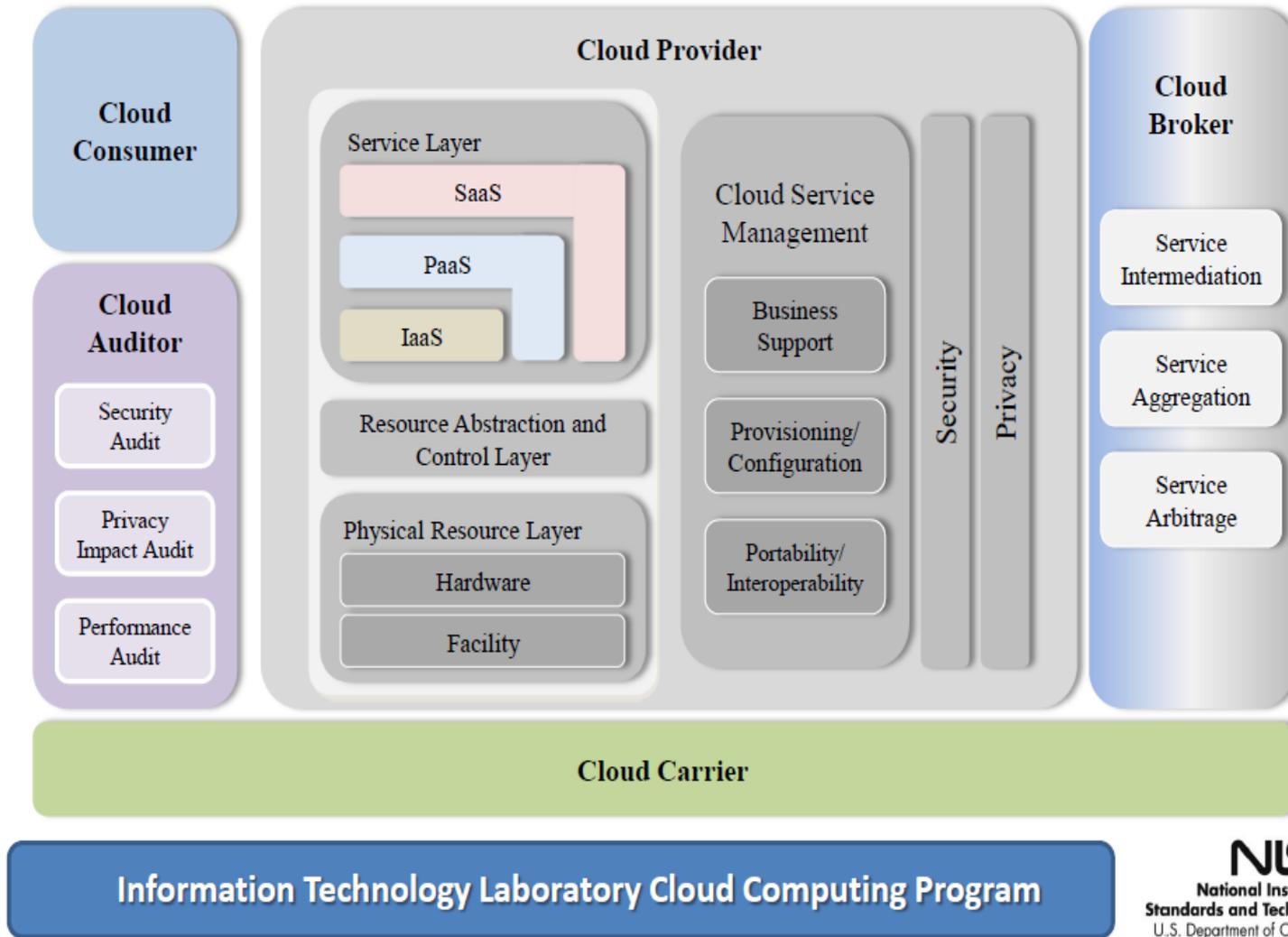
**IaaS (Infrastructure as a Service)**

# Cloud Computing: The 5 Essential Characteristics

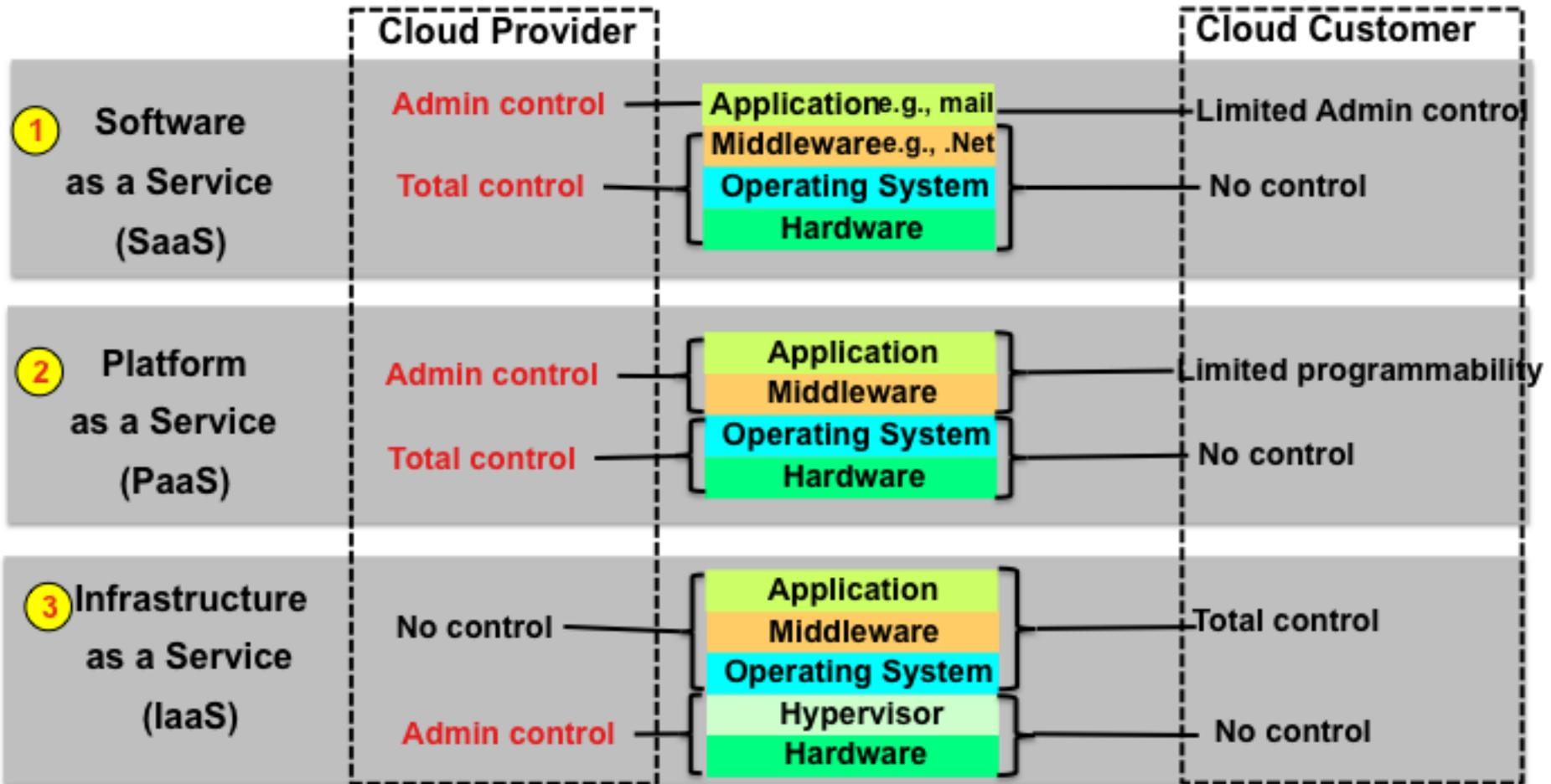
- **On-demand, self-service**
  - by users
  - by developers
  - by architects
- **Resource pooling**
  - Shared resources
- **Rapid elasticity**
  - provision to use
  - release when done
- **Measured service**
  - metering/chargeback
- **Network access**
  - any device, anywhere
    - PC, laptops,
    - smartphones, tablets,  
...



# NIST Reference Architecture



# Who has Control & Who can See What



# “Public” and “Private” Clouds

## Public:

- Google, Amazon EC2, eBay, MS Azure, iCloud, Salesforce, **Oracle**, ...
- Rent-A-Cloud: Pay by the usage metric
  - CPU, Memory, Storage, Bandwidth
  - Contract for SLAs: response time, security, backup & recovery

## Private:

- DIY for your users/members
- Provide IaaS, PaaS, SaaS, DBaaS, STORaaS, ...
- For consolidation, virtualization, of existing IT infrastructure
- ***Moving applications to big data repositories***

# Essential Cloud Technologies for moving applications to big data repositories

- **Massive, elastic compute scalability**
  - Rapid provisioning of
    - apps, OS, virtualization
    - CPUs, networks, memory, I/O
- **Big, fast storage**
  - Capacity, data integrity & privacy/security
- **Fast system interconnects**
  - Data transfer/bandwidth
- **Cloud management**
  - User, developer, administrator self-service
- **Open standards & Interfaces**
  - Commercial & Open Source

# Wellcome Trust Sanger Institute

Oracle Database 11g powers the Institute's massively parallel sequencing archive (MPSA), a 500 terabyte repository used for processing DNA samples that is currently growing at a rate of five terabytes each week.

- Made multi-gigabyte files accessible to more than 800 scientists and researchers
- Optimized data storage and system management
- Replicated data in real time to ensure 24/7 global availability
- Cut database server numbers by more than 50% in six months
- Reduced energy costs significantly

# Oracle's Cloud Computing Strategy

## Deliver systems and software to build public and private clouds

Oracle **ExaLogic** and Oracle **Exadata** for **IaaS**

Oracle **Fusion Middleware** and Oracle **Database** for **PaaS**

Oracle **Fusion Applications** for **SaaS**

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FUSION APPLICATIONS

## Ensure that cloud computing is fully enterprise grade

Highly *efficient, performing, available, scalable* and *secure* infrastructure

*Complete, integrated, and standards-based* development platform

*Modern* set of enterprise applications, including social and mobile

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FUSION MIDDLEWARE

## Provide flexible consumption choices

Private cloud, “as-a-Service” from Oracle Partners or Oracle directly

Flexibility to move applications between these choices

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DATABASE



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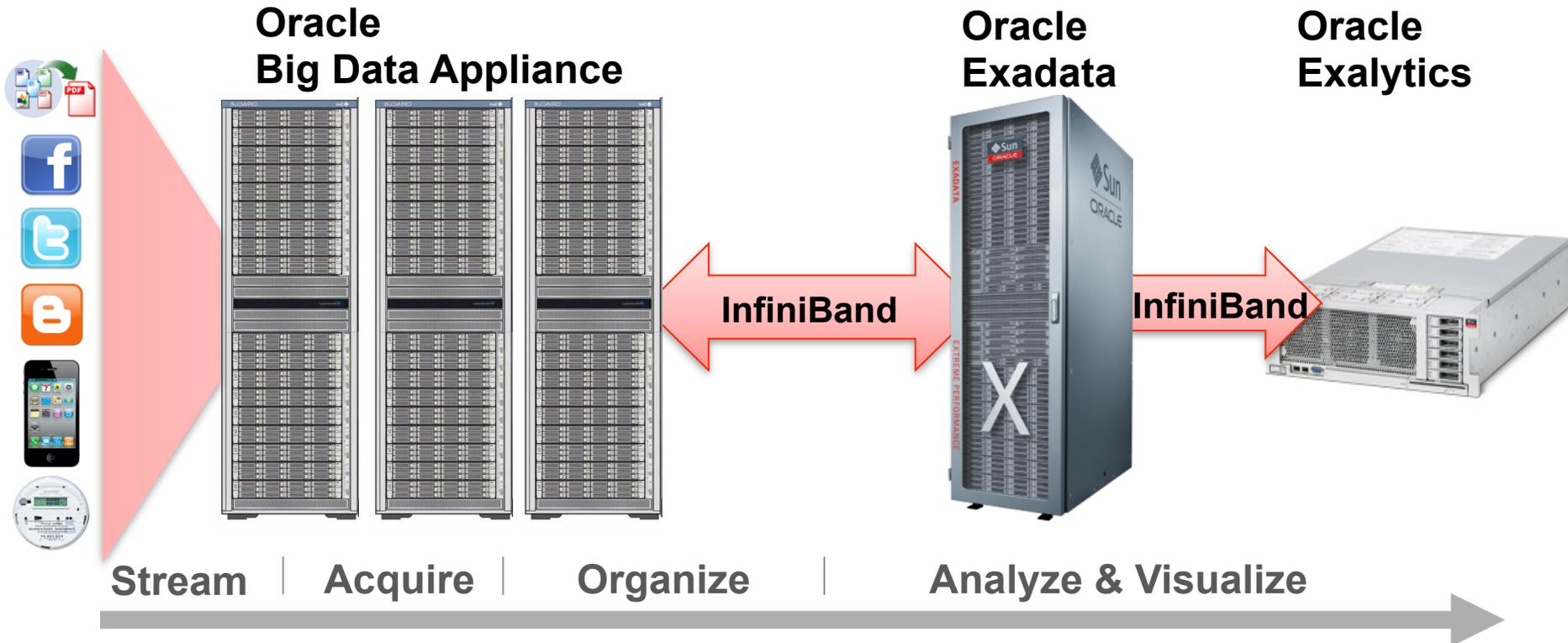
# Oracle Big Data Appliance Software

- Oracle Linux
- Oracle Java VM
- Apache Hadoop Distribution
- Oracle R Enterprise Distribution
- NoSQL Database Enterprise Edition



# Big Data Appliance

## Usage Model – Rapid Analysis of Unstructured Data



# Why build a Big Data / Hadoop Appliance?



Time to Build?

Required Expertise?

Cost and Difficulty Maintaining?

# Big Data Appliance

Cluster of industry standard servers for Hadoop and NoSQL Database

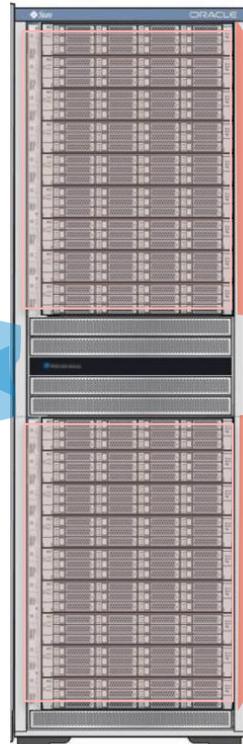
- Focus on **Scalability** and **Availability** at low cost

## InfiniBand Network

- Redundant 40Gb/s switches
- IB connectivity to Exadata

## 10GigE Network

- 8 10GigE ports
- Datacenter connectivity



## Compute and Storage

- 18 High-performance x86 servers acting as Hadoop nodes
- Sun X4270 M2 servers



- 24 TB Capacity per node
- 2 6-core CPUs per node
- Hadoop triple replication
- NoSQL Database triple replication

# Oracle Engineered Systems



Exadata  
Database  
Machine



Exalogic  
Elastic Cloud



Oracle  
Database  
Appliance



Exalytics  
In-Memory  
Machine



Big Data  
Appliance



SPARC  
SuperCluster  
T4-4

**Oracle Engineered Systems share the following characteristics in common:**

- Expedited time to value
- Easier to manage and upgrade
- Lower cost of ownership
- Reduced change mgmt risk
- One-stop support
- Extreme performance

# oracle.com/cloud



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# Hardware and Software

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# Engineered to Work Together