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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)

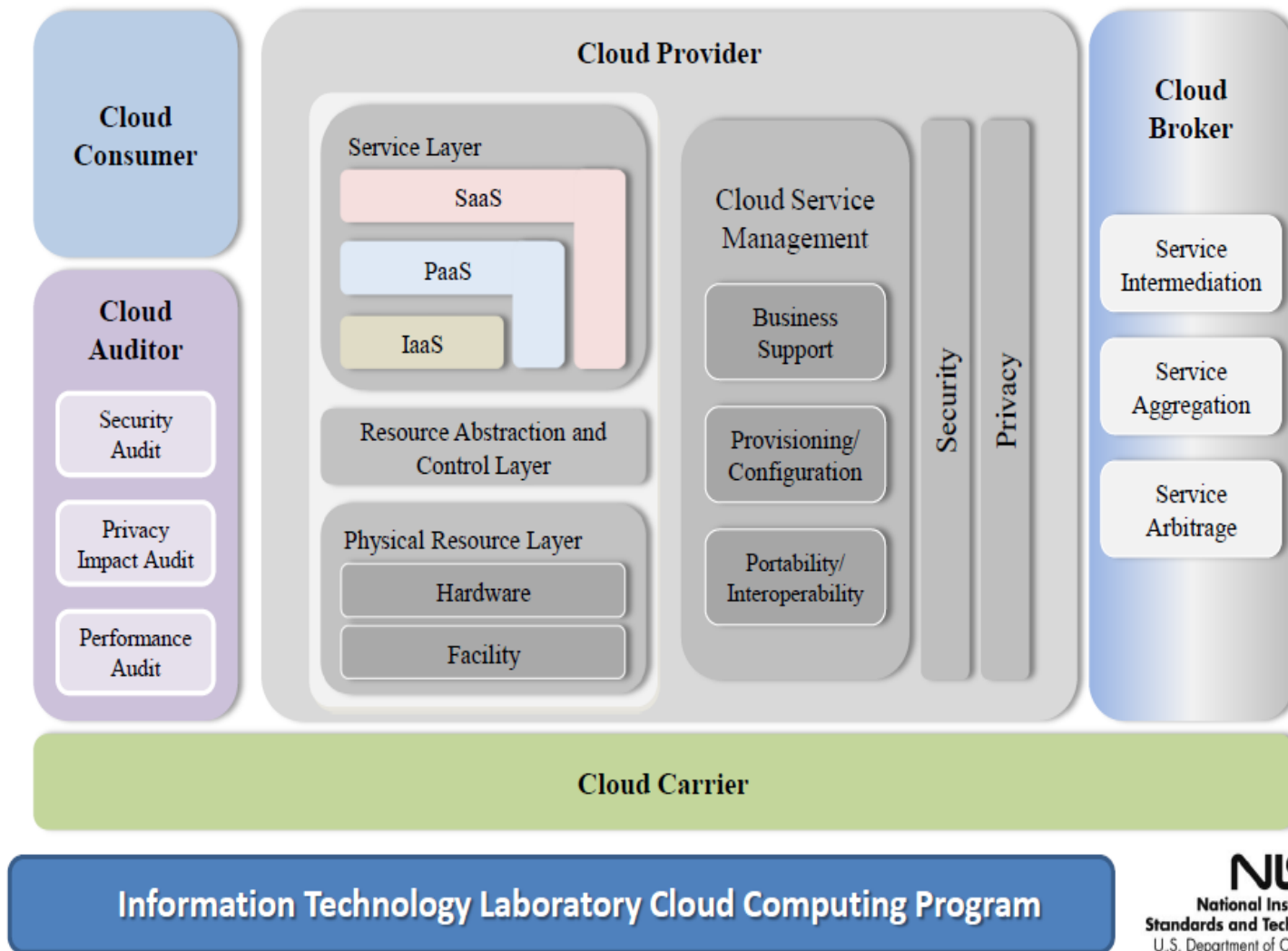
IaaS (Infrastructure as a Service)

Cloud Computing: The 5 Essential Characteristics

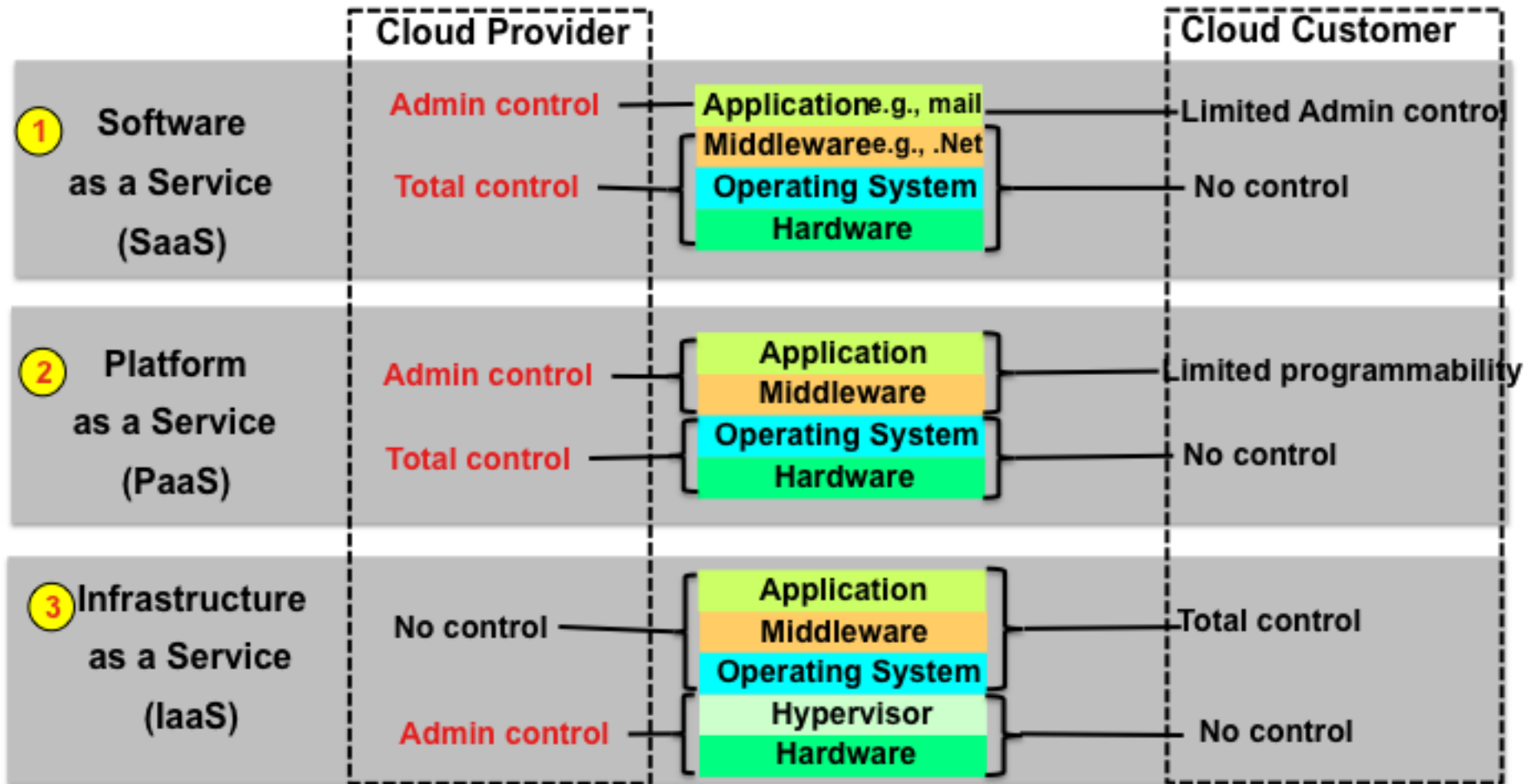
- **On-demand, self-service**
 - by users
 - by developers
 - by architects
- **Resource pooling**
 - Shared resources
- **Rapid elasticity**
 - provision to use
 - release when done
- **Measured service**
 - metering/chargeback
- **Network access**
 - any device, anywhere
 - PC, laptops,
 - smartphones,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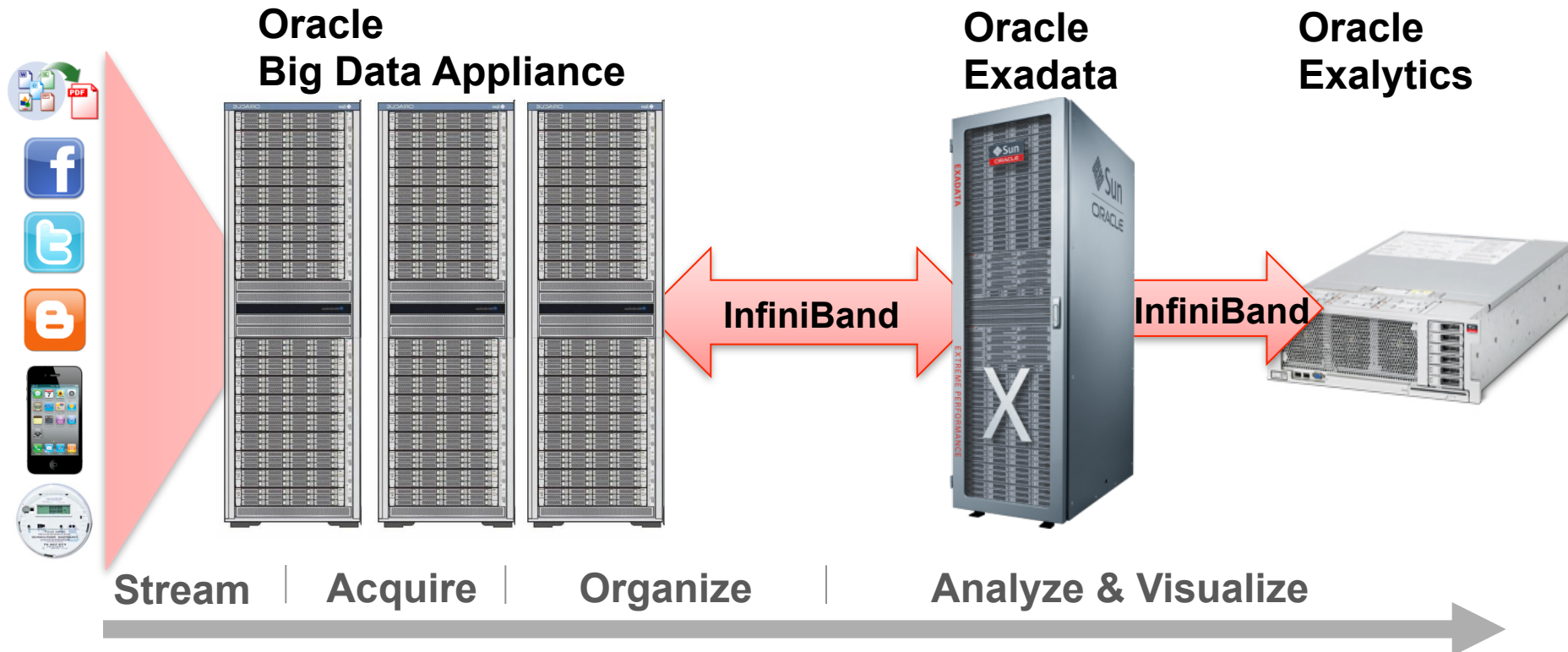
Oracle Big Data Appliance Software

- 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

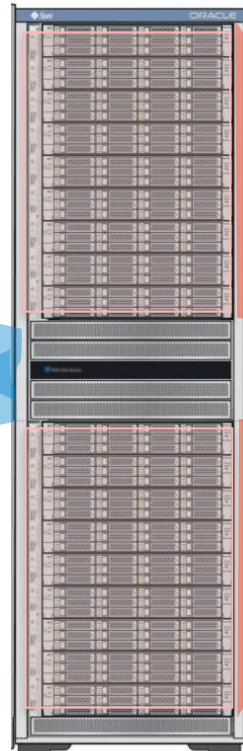
- Focus on **Scalability** and **Availability** at low cost

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

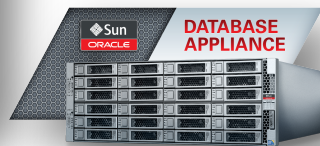
Oracle Engineered Systems



**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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[@OracleCloudZone](https://twitter.com/OracleCloudZone) Hashtag: [#oraclecloud](https://twitter.com/hashtag/oraclecloud)

Hardware and Software

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Engineered to Work Together