National Institute of
Standards and Technology
U.S. Department of Commerce

NIST Cloud Computing Reference Architecture

1. Background

NIST : The goal is to accelerate the federal government’s adoption of secure and effective cloud computing to reduce costs and improve services.

NIST working group

- Cloud Computing Target Business Use Cases
- Cloud Computing Reference Architecture and Taxonomy
- Cloud Computing Standards Roadmap
- Cloud Computing SAJACC (Standards Acceleration to Jumpstart the Adoption of Cloud Computing)
- Cloud Computing Security

2. Objectives

Provides a simple and unambiguous taxonomy of three service models

- Software as a service (SaaS)
- Platform as a service (PaaS)
- Infrastructure as a service (IaaS)

(Private cloud, Community cloud, Public cloud, and Hybrid cloud)

Provides a unifying view of five essential characteristics

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service

The project team developed a Strawman model of architectural concepts

3. Cloud Computing Reference Architecture

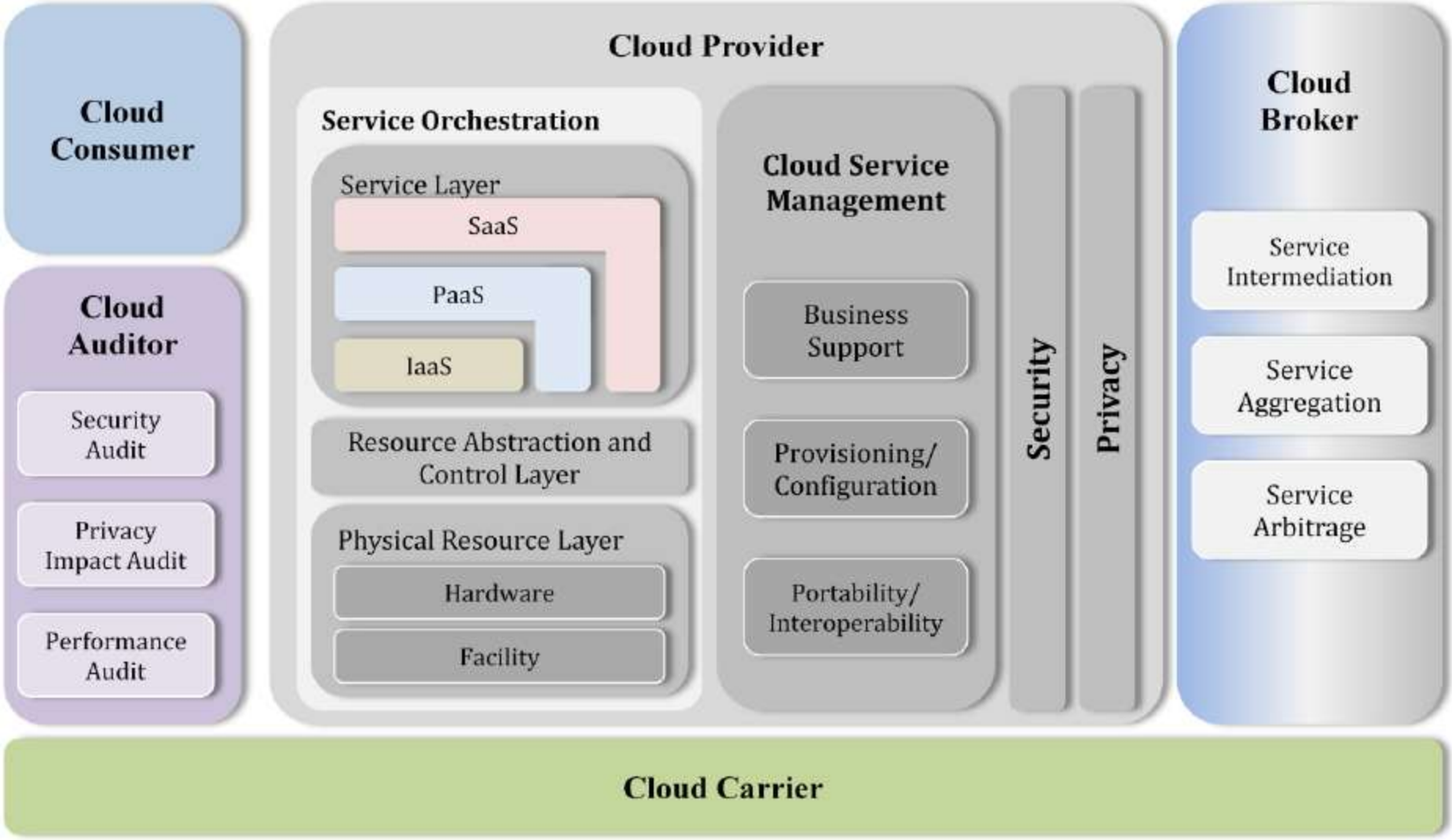

Figure 1: The Conceptual Reference Model

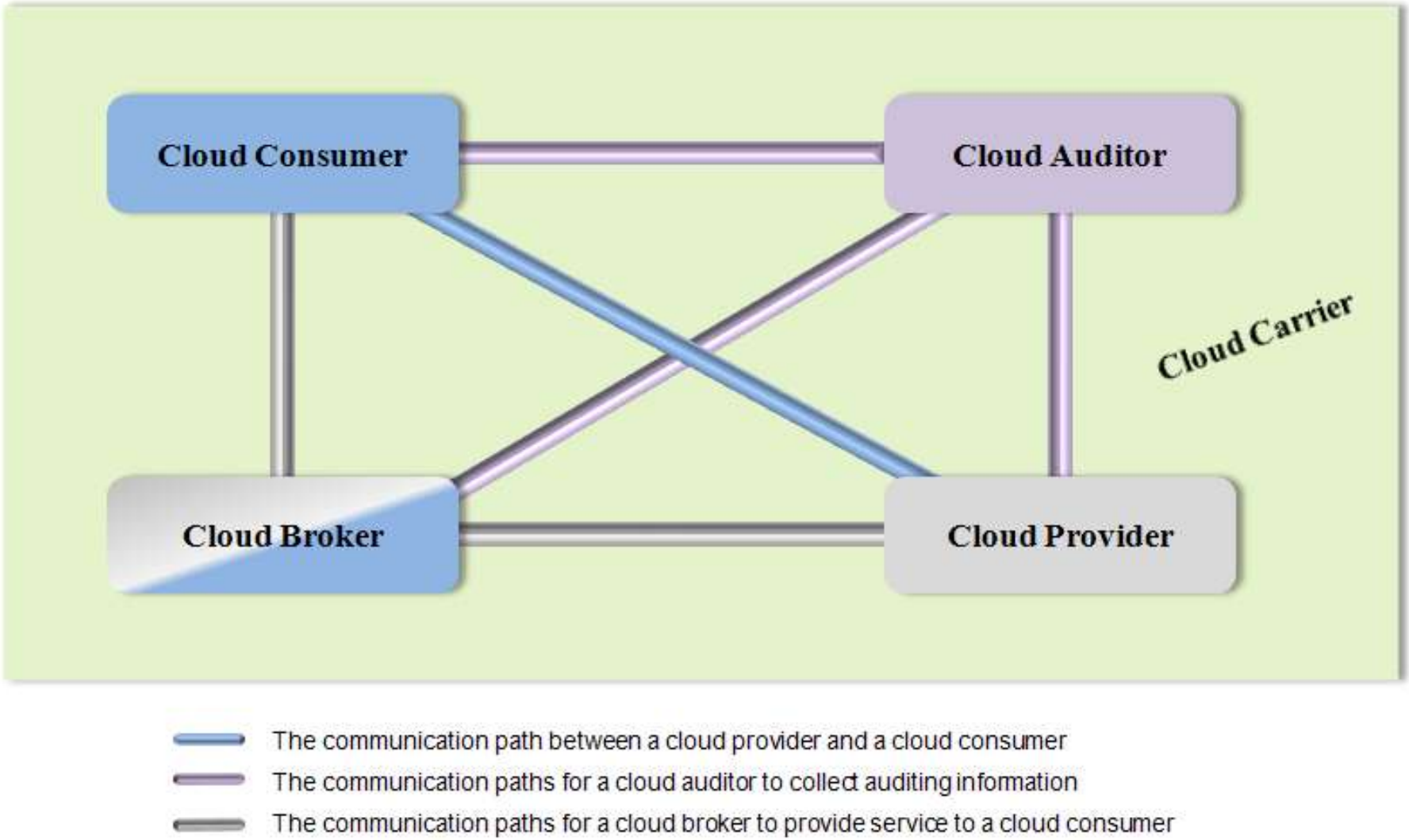

Figure 2: Interactions between the Actors in Cloud Computing

Figure 3: Usage Scenario for Cloud Brokers

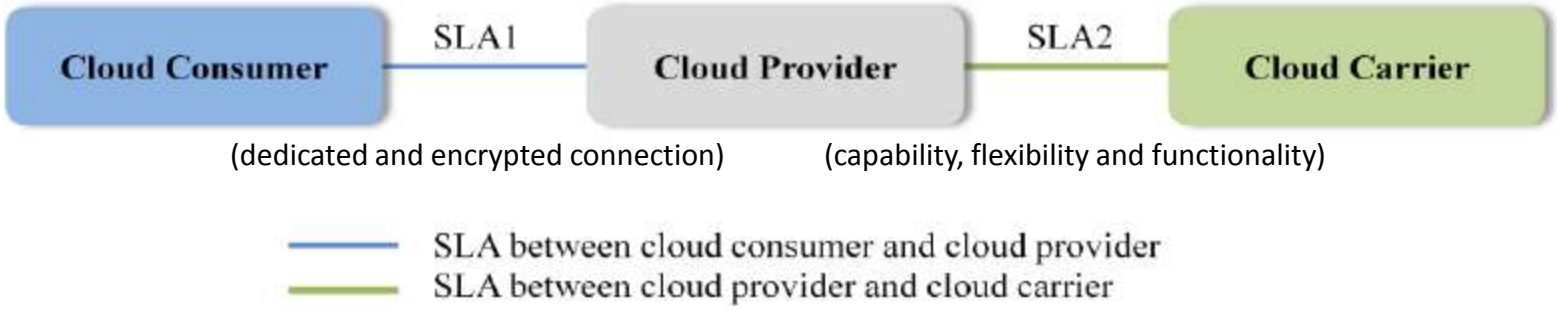

Figure 4: Usage Scenario for Cloud Carriers

Figure 5: Usage Scenario for Cloud Auditors

Cloud Consumer

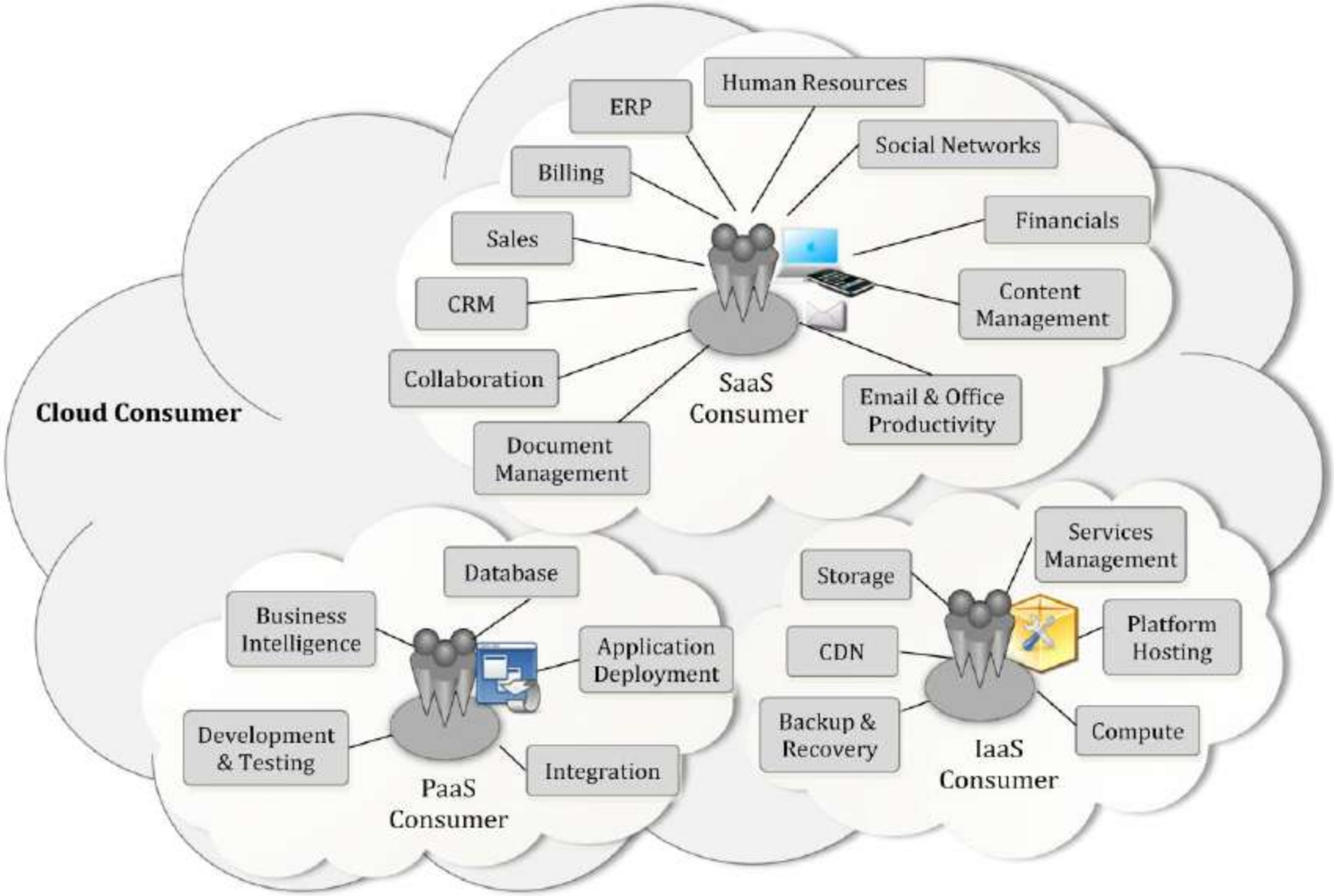

Figure 6: Example Services Available to a Cloud Consumer

Cloud Provider

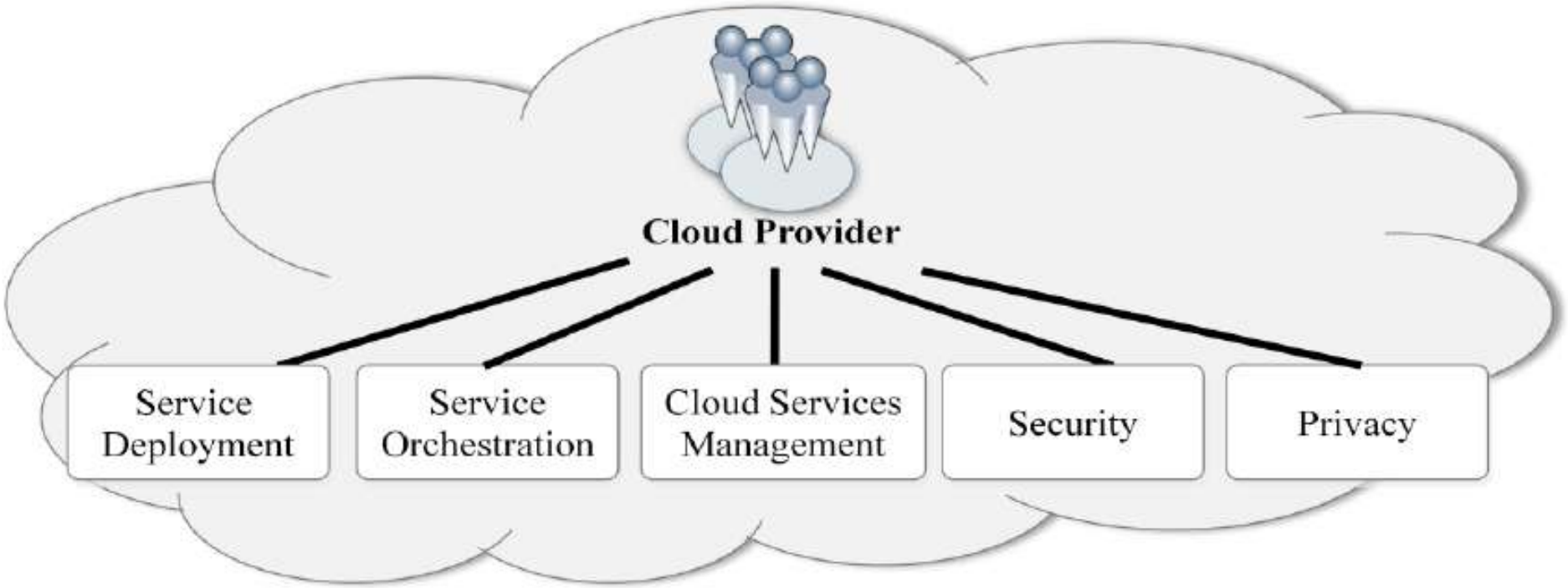

Figure 7: Cloud Provider - Major Activities

Cloud Auditor => security controls, privacy impact, performance

Cloud Broker => intermediation, aggregation, arbitrage

Cloud Carrier

provides connectivity and transport of cloud services between cloud consumers and cloud providers (network, telecommunication, access devices)

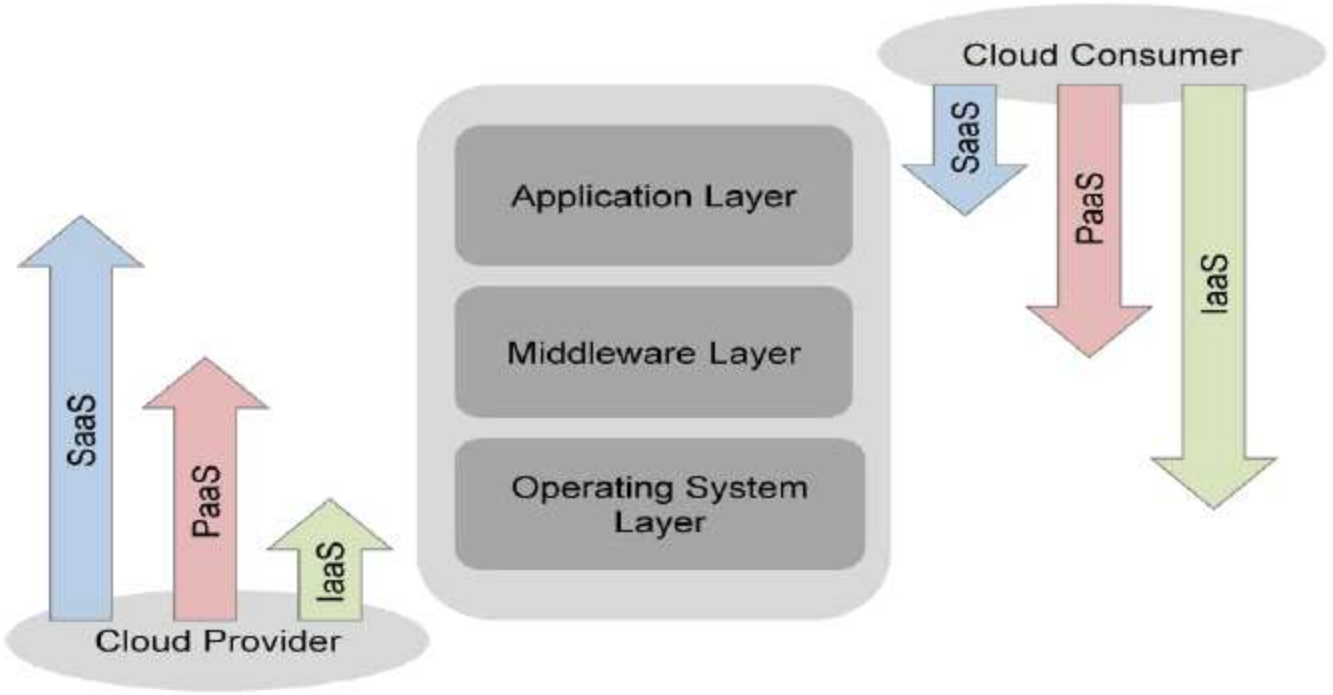

Figure 8: Scope of Controls between Provider and Consumer

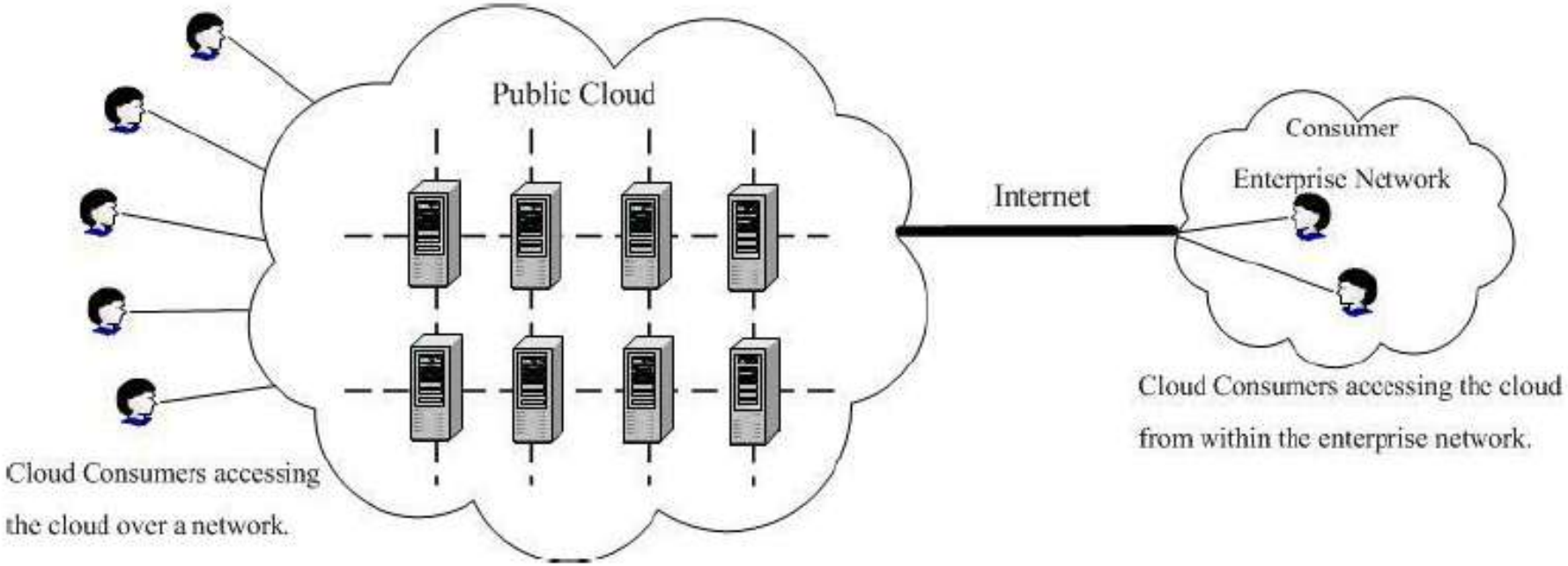

Figure 9: Public Cloud

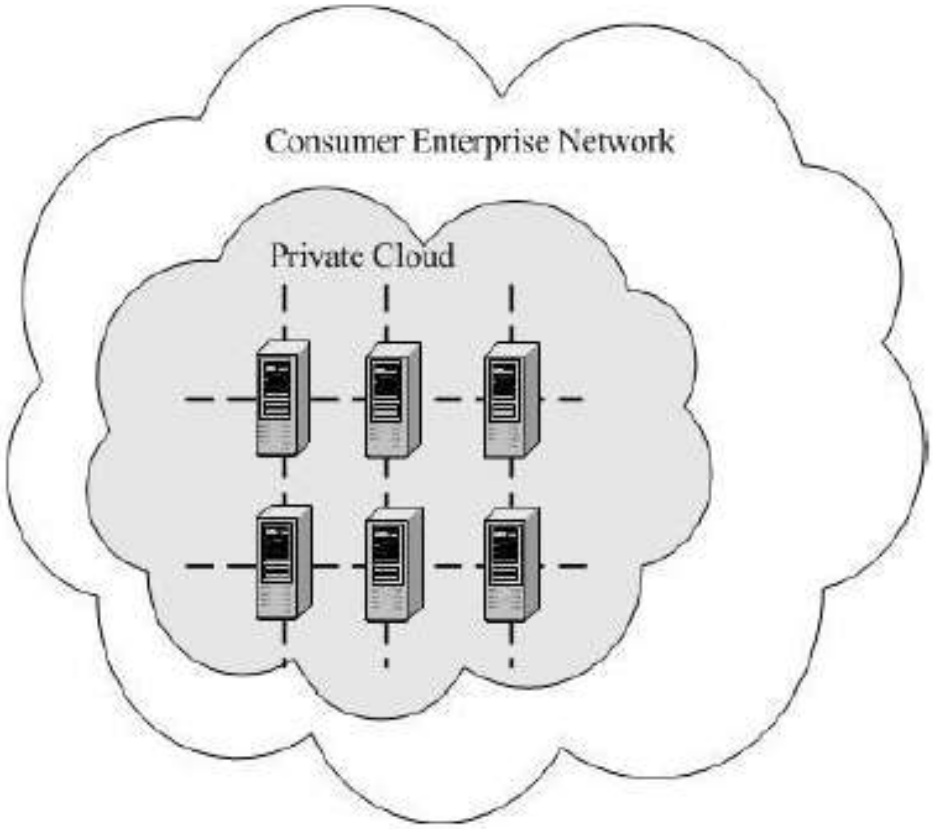

Figure 10: On-site Private Cloud

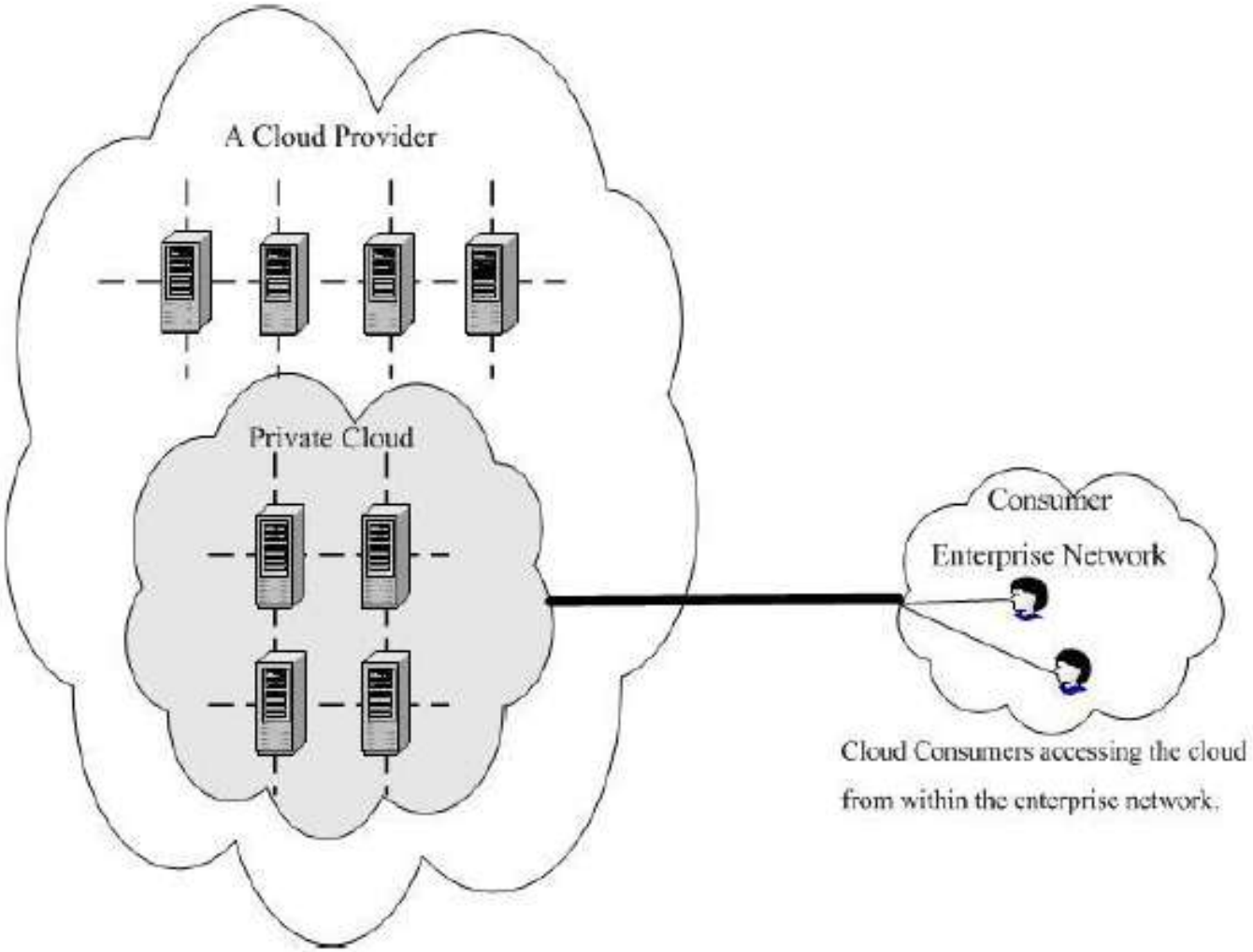

Figure 11: Out-sourced Private Cloud

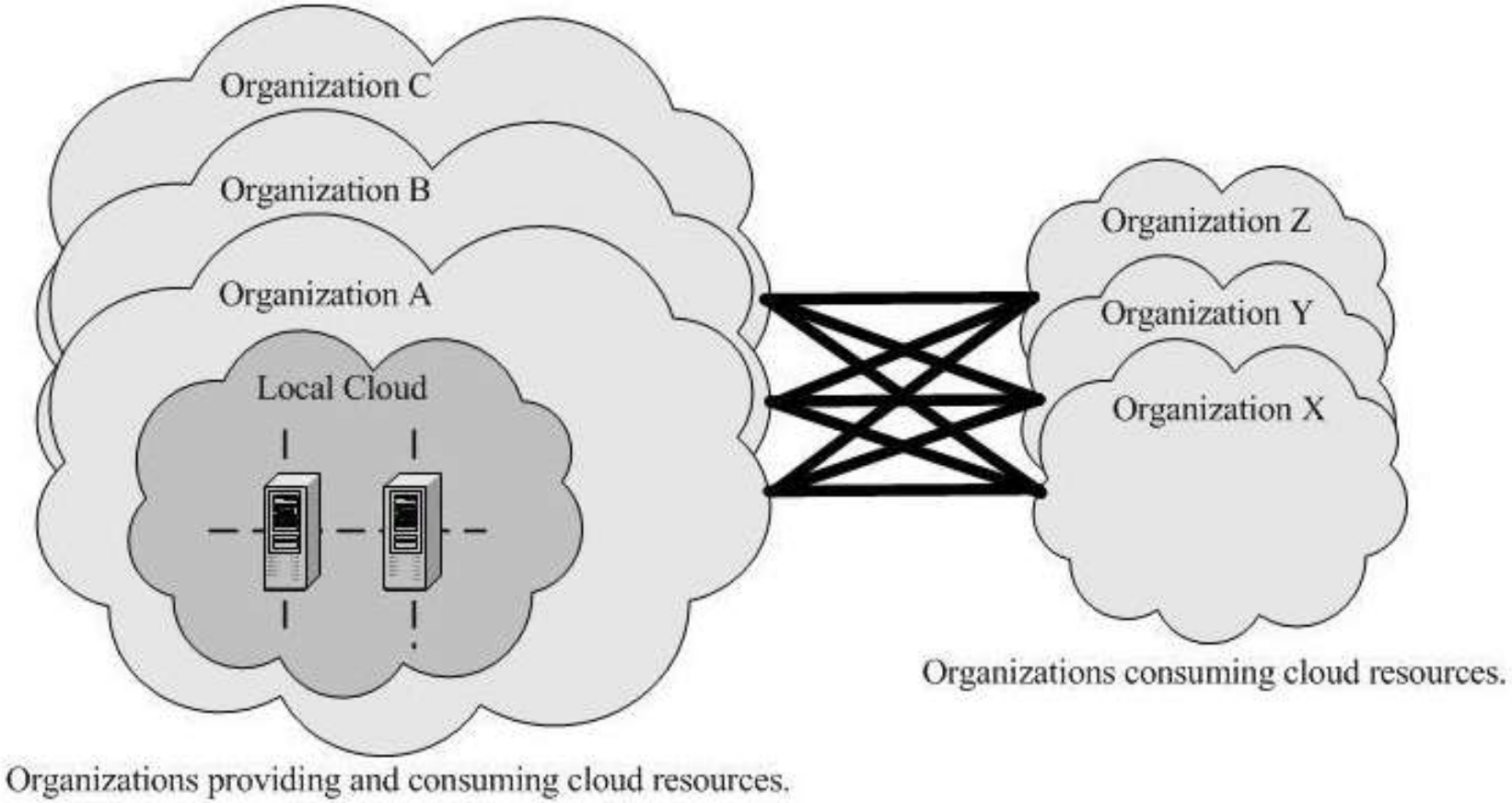

Figure 12: On-site Community Cloud

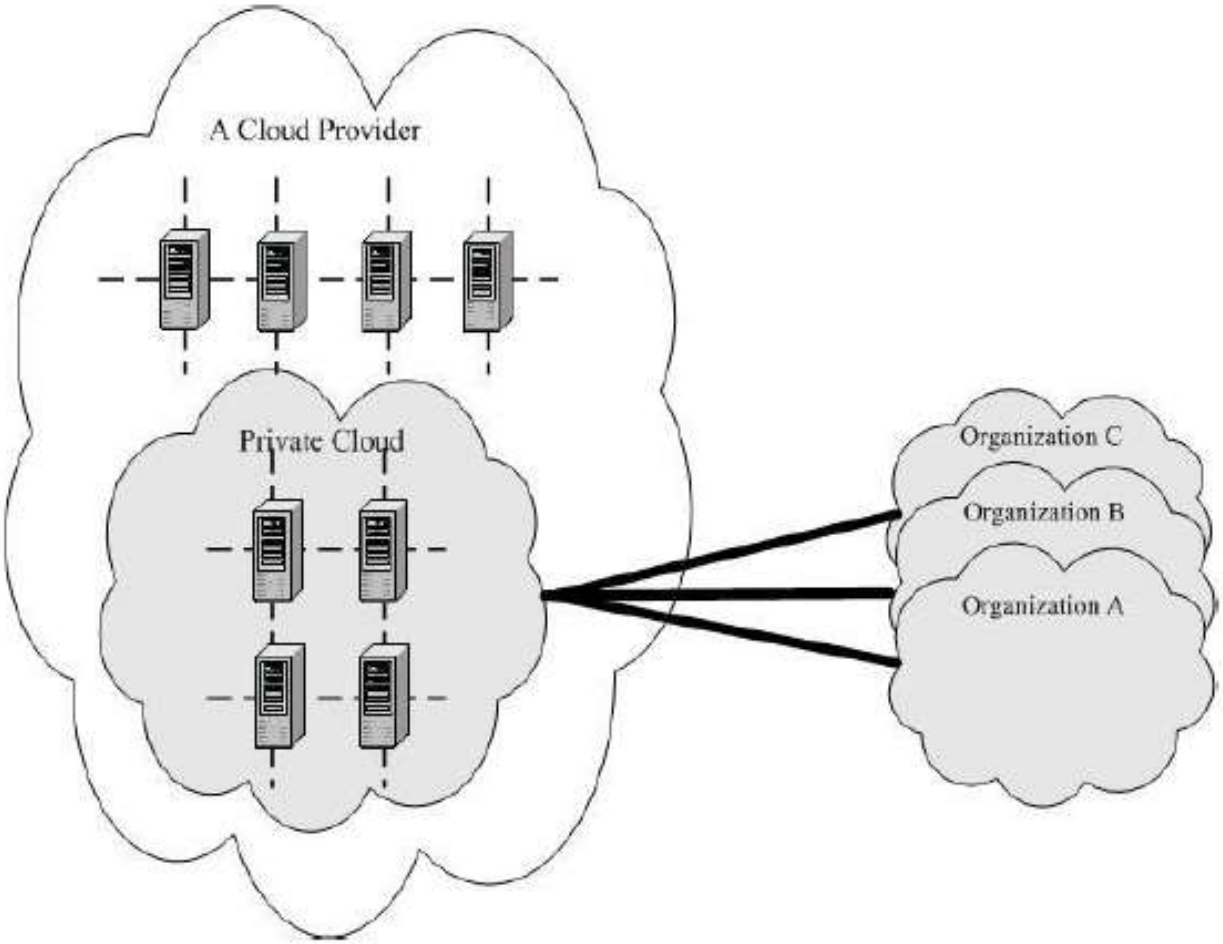

Figure 13: Outsourced Community Cloud

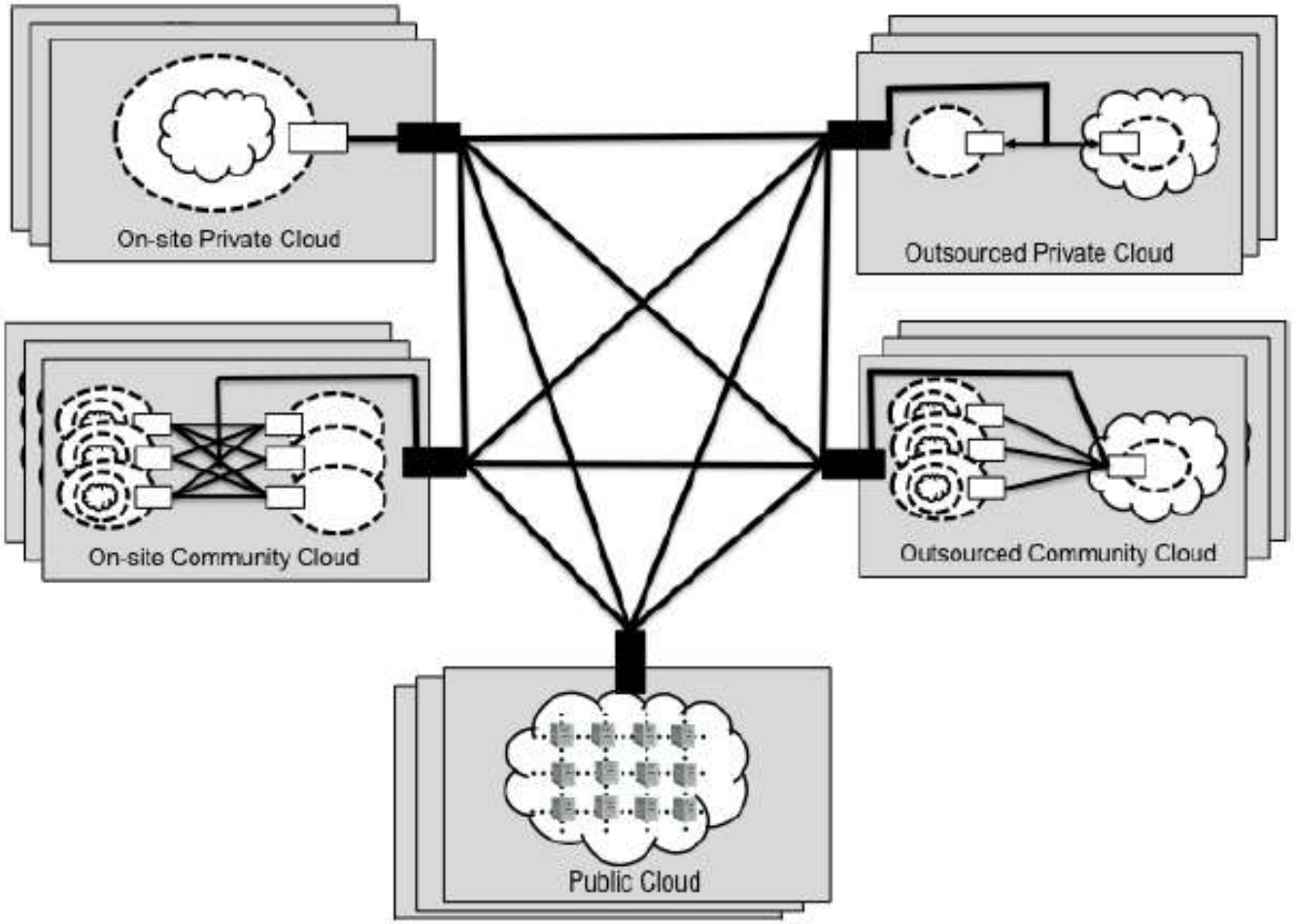

Figure 14: Hybrid Cloud

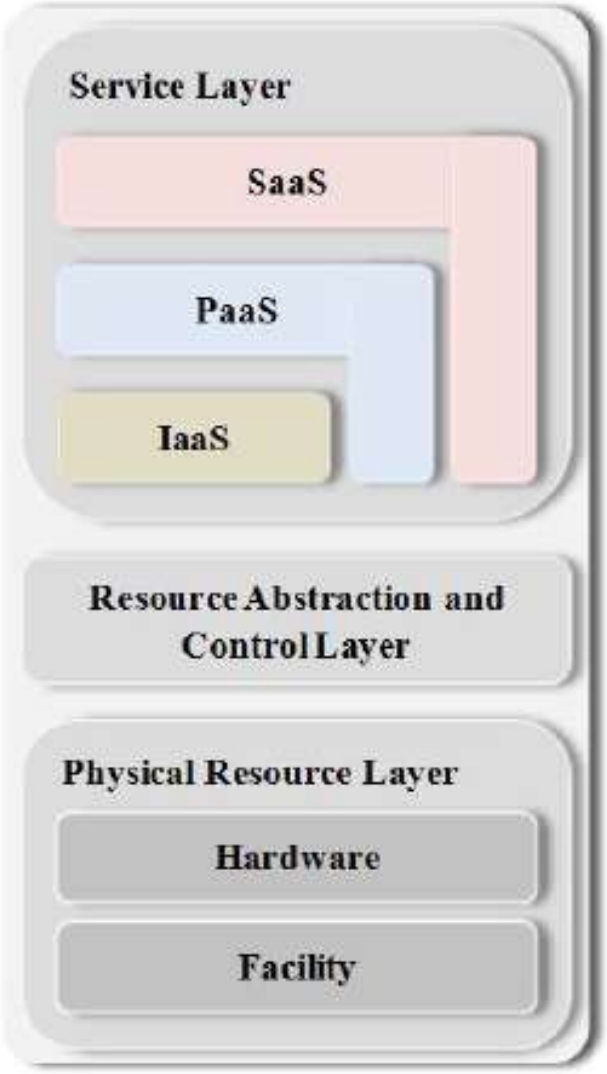

Figure 15: Cloud Provider - Service Orchestration

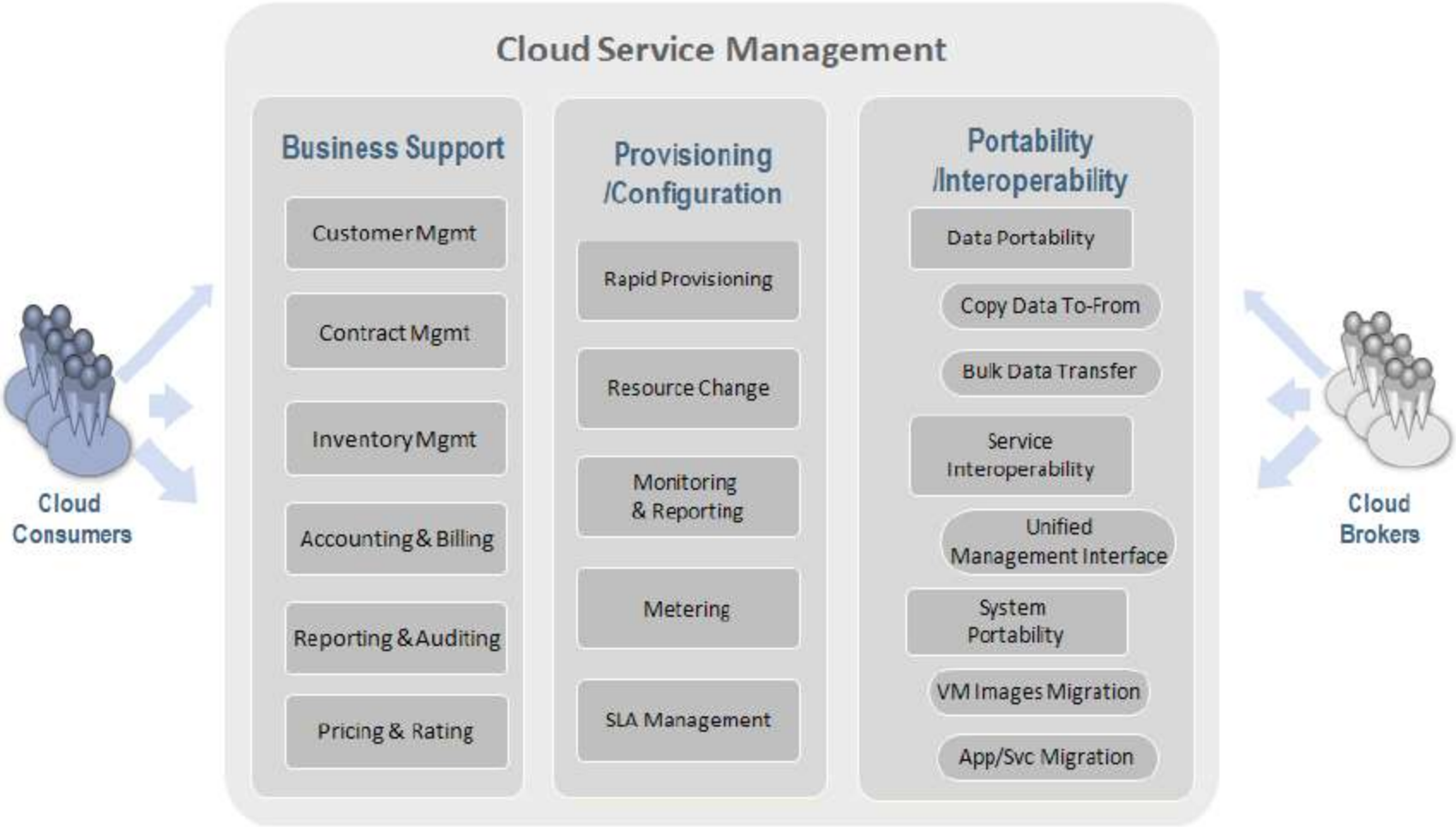

Figure 16: Cloud Provider - Cloud Service Management

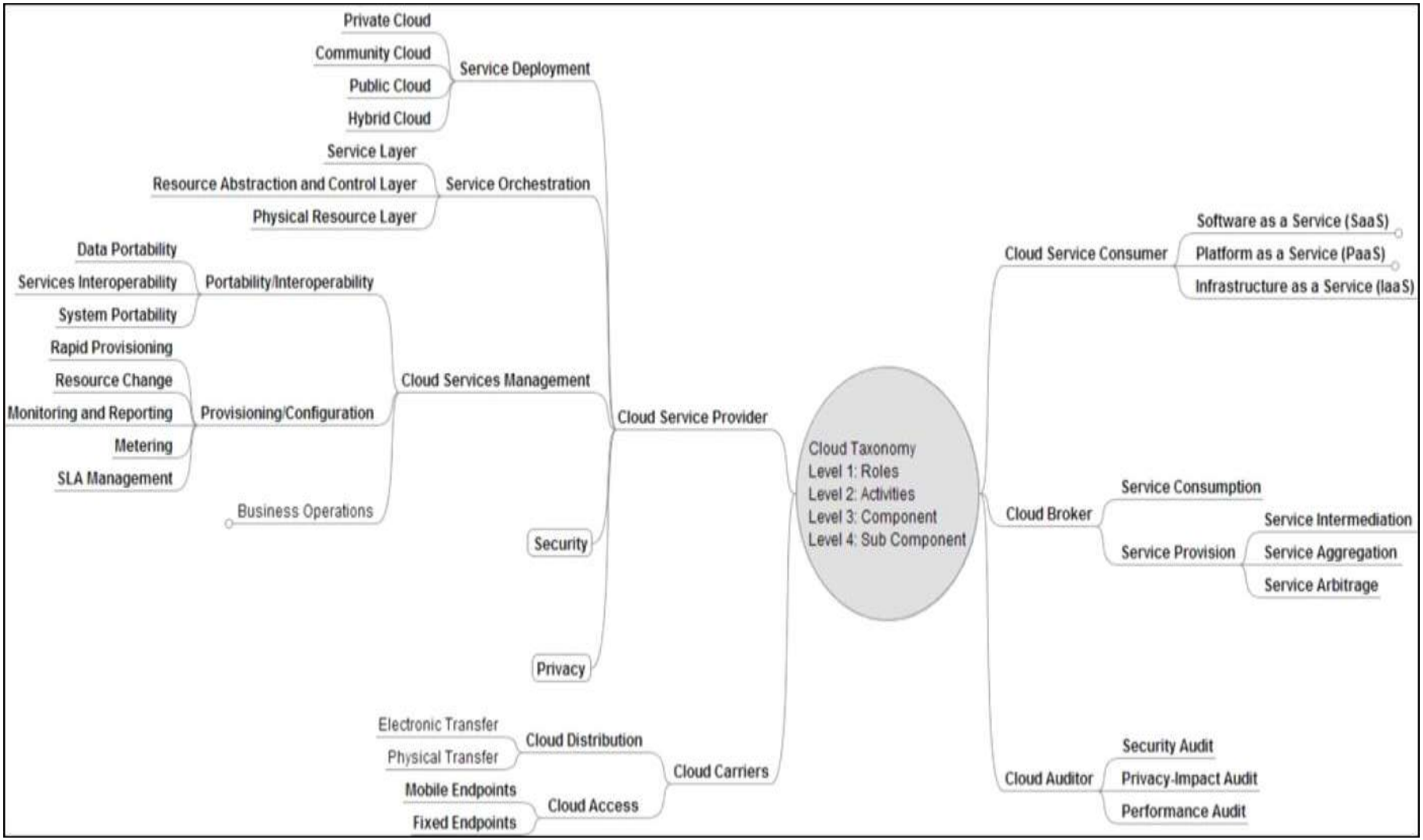

Figure 17: Cloud Taxonomy