BSS/OSS Implications in Cloud Computing

Palani Vel, Chief Technology Strategist, June 2012

Cloud Computing – Actors and their Roles

Cloud Consumer

Person or Organization that maintains a business relationship with, and uses service from *Cloud Providers*.

Cloud Provider

Person, organization or entity responsible for making a service available to *Cloud Consumers*.

Cloud Broker

An entity that manages the use, performance and delivery of cloud services, and negotiates relationships between *Cloud Providers and Cloud Consumers*.
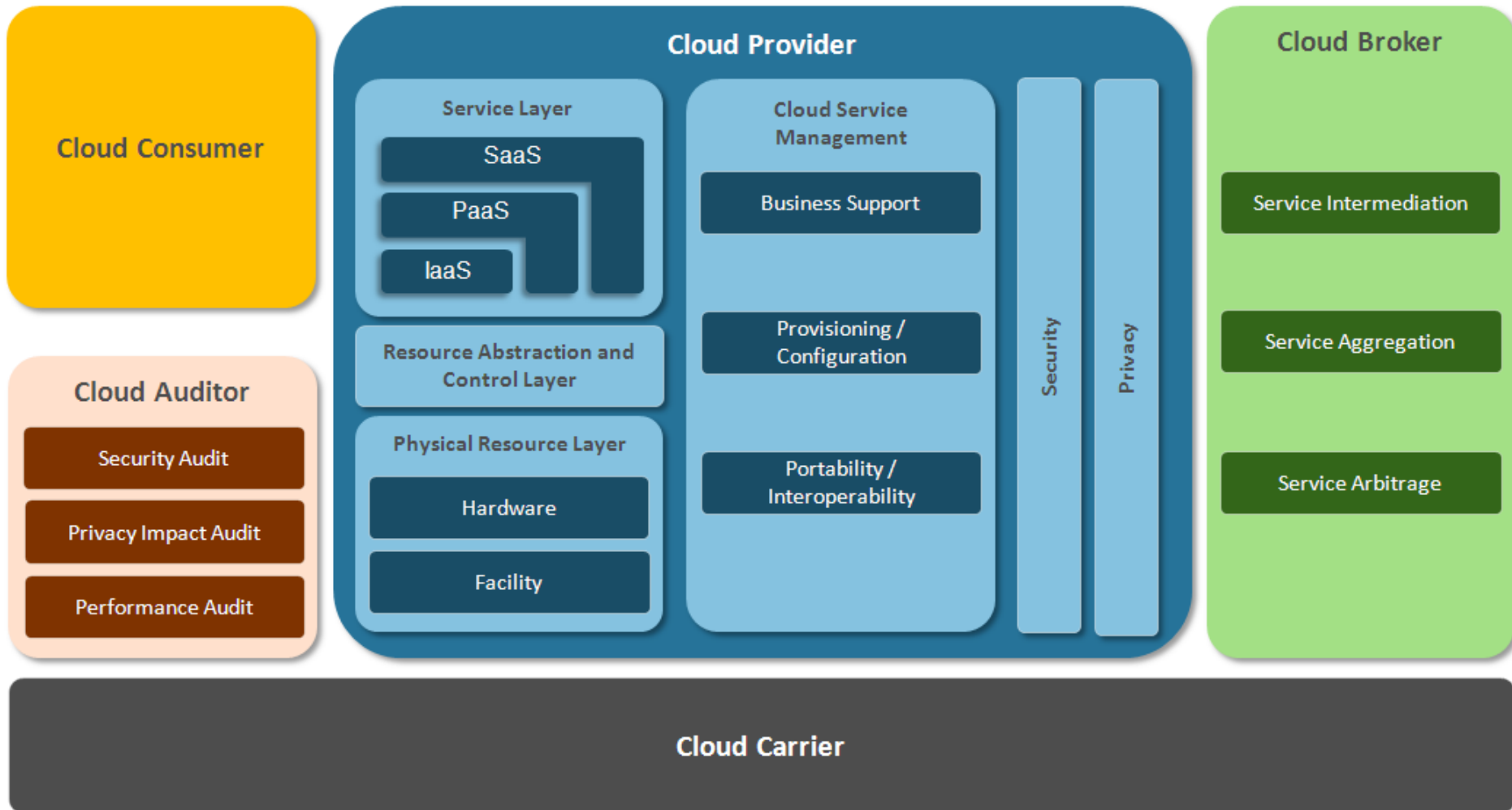
Cloud Auditor

A party that can conduct independent assessment of cloud services, information system operations, performance and security of the cloud implementation.
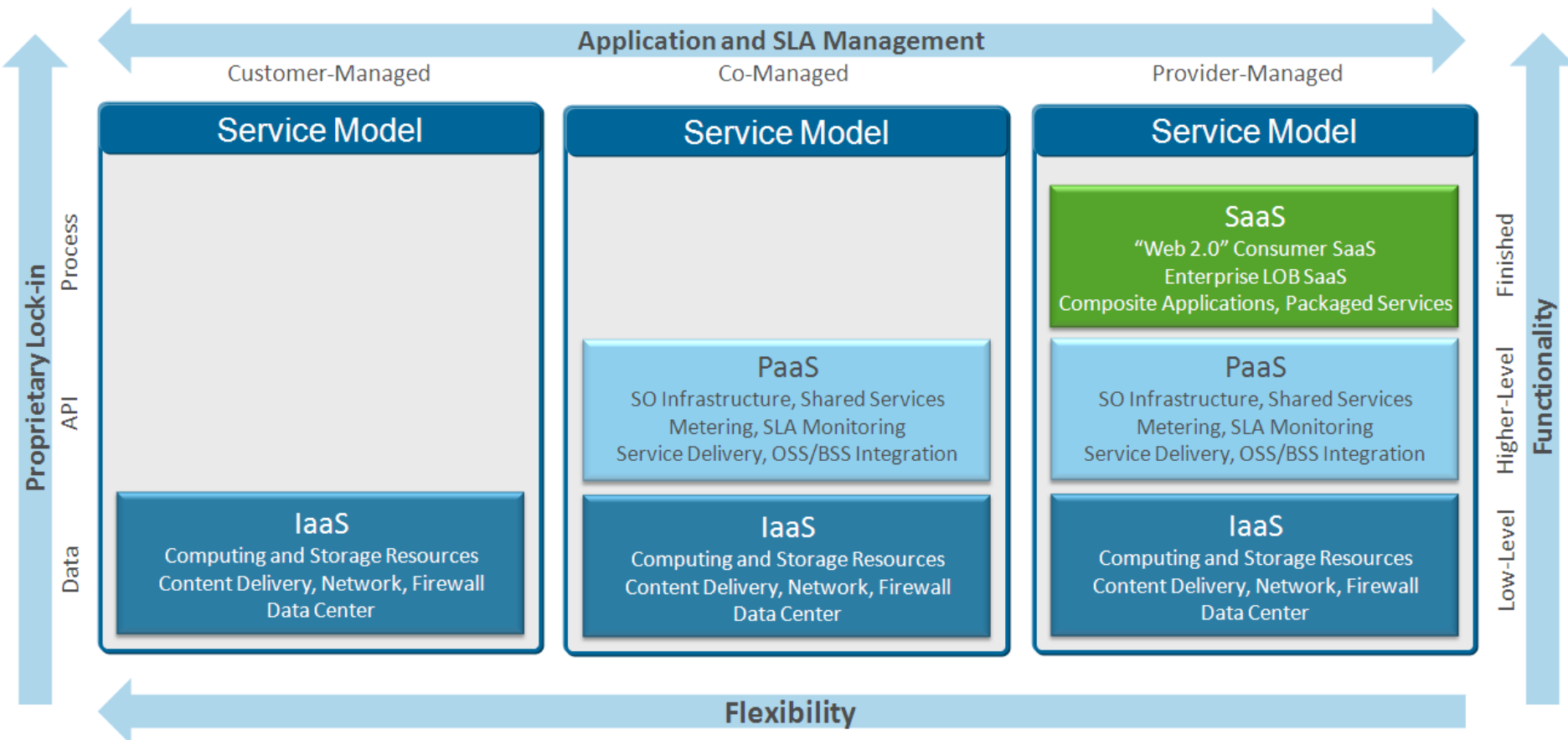
Cloud Carrier

The intermediary that provides connectivity and transport of cloud services from *Cloud Providers* to *Cloud Consumers*

Reference: NIST

Cloud Computing – Reference Architecture

Cloud Consumer

Cloud Provider

Service Layer
- SaaS
- PaaS
- IaaS

Resource Abstraction and Control Layer

Physical Resource Layer
- Hardware
- Facility

Cloud Service Management
- Business Support
- Provisioning / Configuration
- Portability / Interoperability

Security

Privacy

Cloud Broker
- Service Intermediation
- Service Aggregation
- Service Arbitrage

Cloud Auditor
- Security Audit
- Privacy Impact Audit
- Performance Audit

Cloud Carrier

Reference: NIST

Cloud Computing – Service Model Architectures

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Cloud Computing – Service Model Ecosystem

Supply-Chain

SI and VAR

"SaaS" Buyers
(Consumer / Enterprise)

Aggregators
ISV ISV

ISV ISV

"SaaS" Hosters

"Classic" Hosters

Value-Chain

IT as a Portfolio of Services
"on-premise" + "off-premise"
Integration
Composition

SaaS
"Web 2.0" Consumer SaaS
Enterprise LOB SaaS
Composite Applications, Packaged Services

SaaS Platform
SO Infrastructure, Shared Services
Metering, SLA Monitoring
Service Delivery, OSS/BSS Integration

Infrastructure
Computing and Storage Resources
Content Delivery, Network, Firewall
Data Center

SaaS Enablement

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CSP's Role in Cloud Computing

What CSPs can potentially offer to their customer-base ?

As a Cloud Provider

Network-Centric Services:
- **Communication Services**
- **Location-based Services**
- **Access Devices and Platform**
- **Network and Transport**
+
Infrastructure as Services:
- **Compute**
- **Storage**
- **Content Delivery**
- **Network**
- **Virtual Private Cloud**

As a Cloud Broker
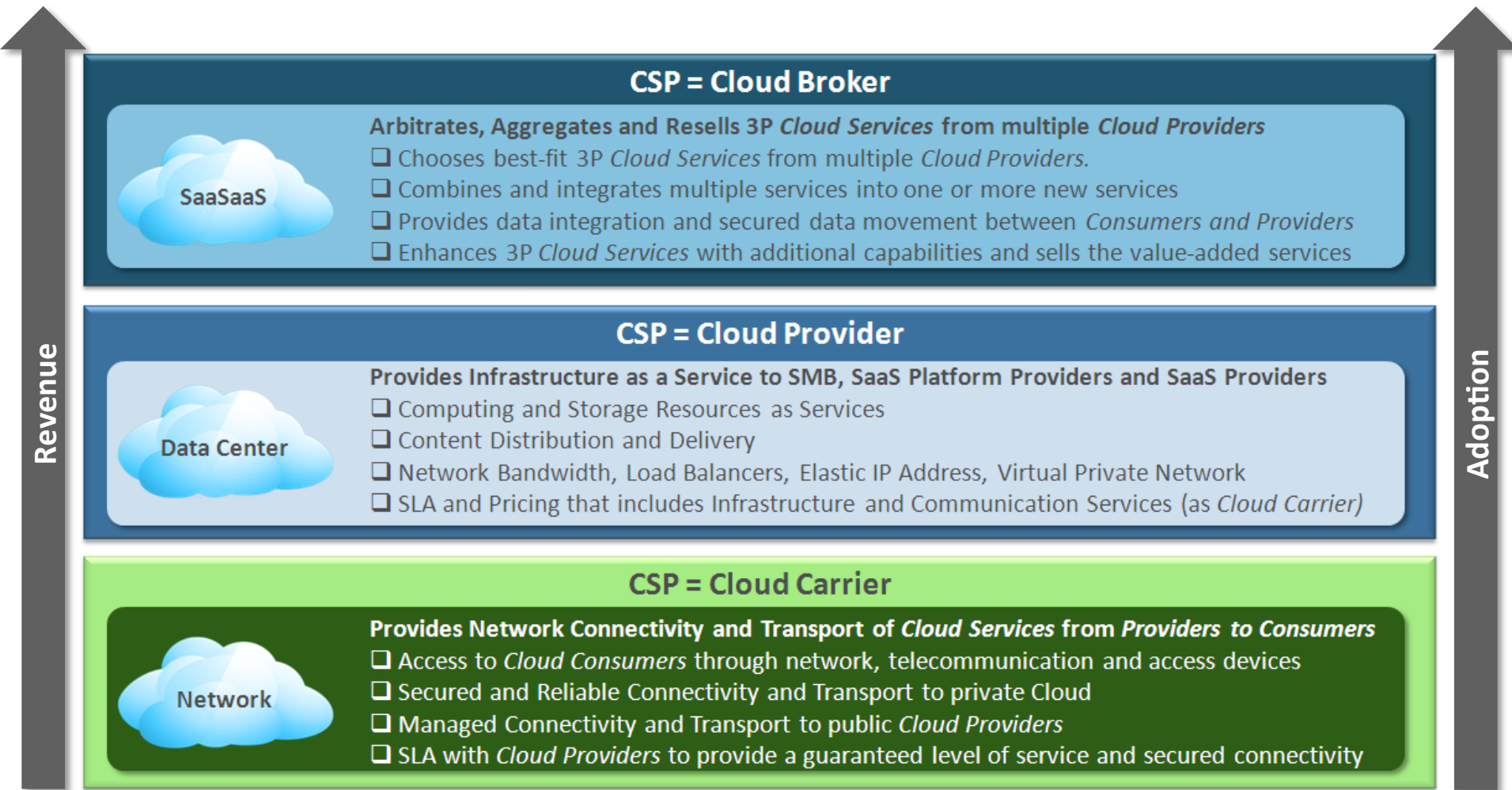
Network-Centric Services:
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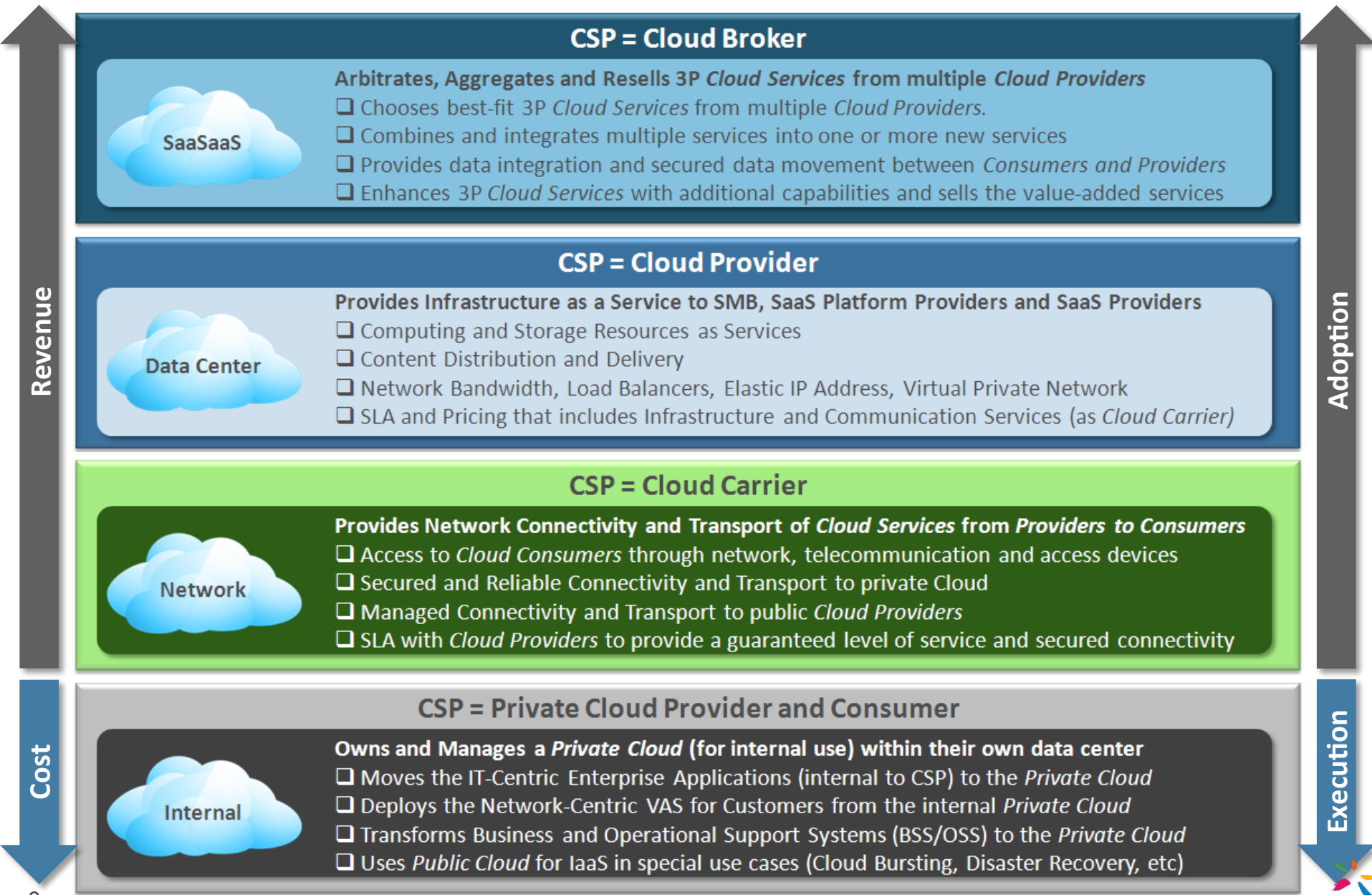**Reselling OTT Enterprise SaaS as Services:**
- **Messaging and Collaboration Apps**
- **Office Productivity Apps**
- **Enterprise Resource Planning**
- **Customer Relationship Management**
- **Enterprise SaaS Market Place**

While not all the CSPs would find it compelling to become a Cloud Provider, many of them could become a Cloud Broker - bundling Communication Services and Cloud Services for their SMB install-base.

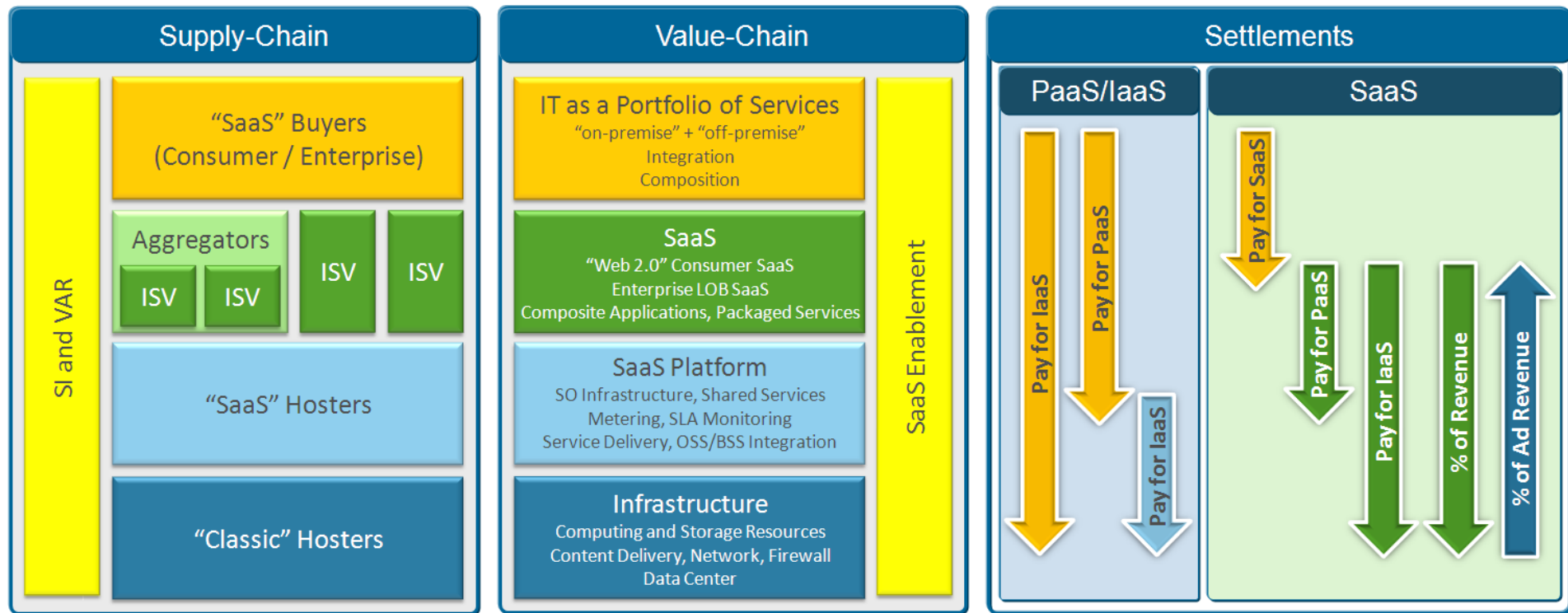COMVERSE

Cloud Business Models for CSP

Revenue ↑

Adoption ↑

CSP = Cloud Broker

SaaSaaS

Arbitrates, Aggregates and Resells 3P *Cloud Services* from multiple *Cloud Providers*
- ❏ Chooses best-fit 3P *Cloud Services* from multiple *Cloud Providers*.
- ❏ Combines and integrates multiple services into one or more new services
- ❏ Provides data integration and secured data movement between *Consumers and Providers*
- ❏ Enhances 3P *Cloud Services* with additional capabilities and sells the value-added services

CSP = Cloud Provider

Data Center

Provides Infrastructure as a Service to SMB, SaaS Platform Providers and SaaS Providers
- ❏ Computing and Storage Resources as Services
- ❏ Content Distribution and Delivery
- ❏ Network Bandwidth, Load Balancers, Elastic IP Address, Virtual Private Network
- ❏ SLA and Pricing that includes Infrastructure and Communication Services (as *Cloud Carrier*)

CSP = Cloud Carrier

Network

Provides Network Connectivity and Transport of *Cloud Services* from *Providers to Consumers*
- ❏ Access to *Cloud Consumers* through network, telecommunication and access devices
- ❏ Secured and Reliable Connectivity and Transport to private Cloud
- ❏ Managed Connectivity and Transport to public *Cloud Providers*
- ❏ SLA with *Cloud Providers* to provide a guaranteed level of service and secured connectivity

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Cloud Business Models for CSP

Revenue ↑

Cost ↓

Adoption ↑

Execution ↓

CSP = Cloud Broker

SaaSaaS

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CSP = Private Cloud Provider and Consumer

Internal

Owns and Manages a _Private Cloud_ (for internal use) within their own data center
- ❑ Moves the IT-Centric Enterprise Applications (internal to CSP) to the _Private Cloud_
- ❑ Deploys the Network-Centric VAS for Customers from the internal _Private Cloud_
- ❑ Transforms Business and Operational Support Systems (BSS/OSS) to the _Private Cloud_
- ❑ Uses _Public Cloud_ for IaaS in special use cases (Cloud Bursting, Disaster Recovery, etc)

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Cloud Service Model Ecosystem and Settlements

Reqd. Supply-Chain and Settlements Model for Amazon-like Approach

Supply-Chain

SI and VAR

- "SaaS" Buyers (Consumer / Enterprise)
- Aggregators
  - ISV
  - ISV
  - ISV
  - ISV
- "SaaS" Hosters
- "Classic" Hosters

Value-Chain

- **IT as a Portfolio of Services**
  "on-premise" + "off-premise"
  Integration
  Composition
- **SaaS**
  "Web 2.0" Consumer SaaS
  Enterprise LOB SaaS
  Composite Applications, Packaged Services
- **SaaS Platform**
  SO Infrastructure, Shared Services
  Metering, SLA Monitoring
  Service Delivery, OSS/BSS Integration
- **Infrastructure**
  Computing and Storage Resources
  Content Delivery, Network, Firewall
  Data Center

SaaS Enablement

Settlements

PaaS/IaaS
- Pay for IaaS
- Pay for PaaS
- Pay for IaaS

SaaS
- Pay for SaaS
- Pay for PaaS
- Pay for IaaS
- % of Revenue
- % of Ad Revenue

Cloud Provider (a provider of IaaS and PaaS) **provides an easy-to-use and fine-grained IaaS (e.g. Computing, Storage, Network) and PaaS (e.g. Database, Service Bus) that enables SaaS Providers, Aggregators & Resellers to develop and offer their own SaaS**

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Cloud Service Model Ecosystem and Settlements

Reqd. Supply-Chain and Settlements Model for Google-like Approach
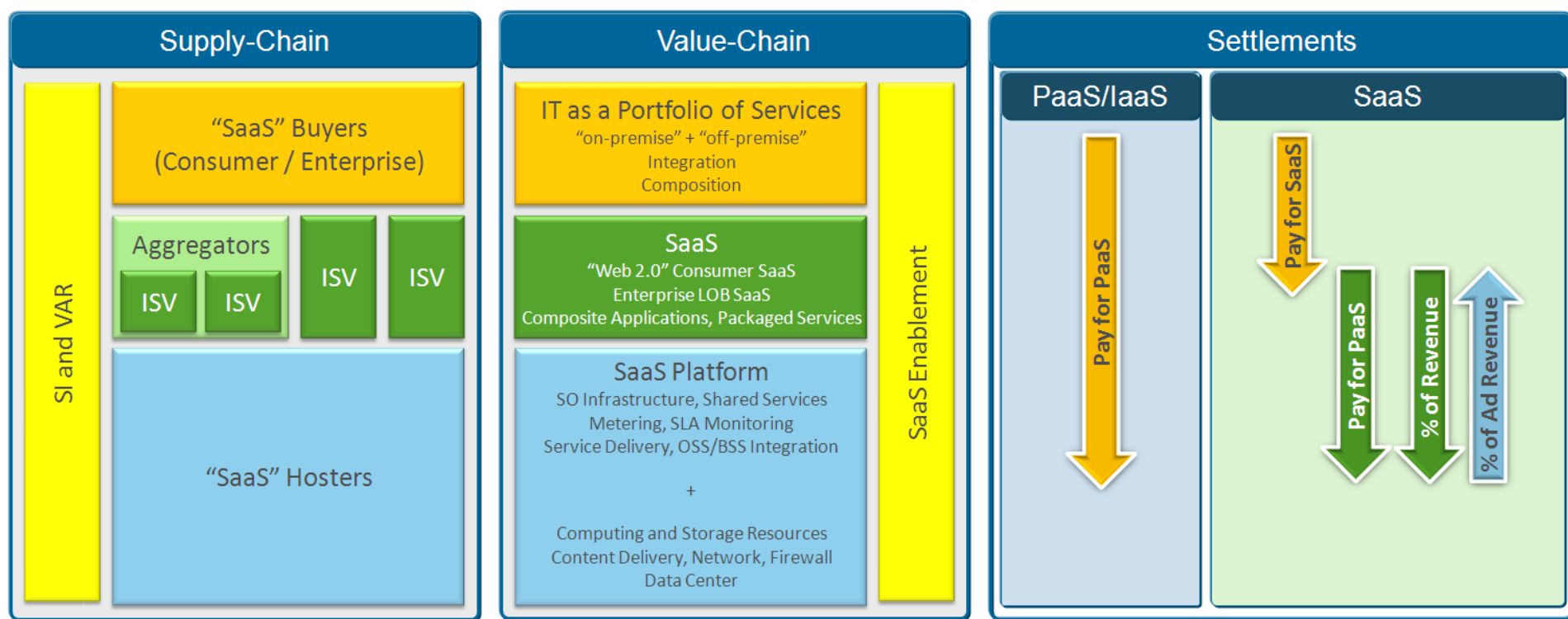
Cloud Provider **provides a higher-level (coarse-grained) SaaS Platform that abstracts its underlying Infrastructure and Platform from its consumers, and allows SaaS Providers, Aggregators & Resellers to easily develop and offer their own SaaS**

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Typical Cloud Service Catalog, Metering & Billing

IaaS

Compute
- Micro, Small, Medium, Large, Extra Large
- Linux, Windows, Open Solaris
- Physically Shared / Dedicated

Storage
- Elastic Block Storage
- Storage as a Service

Content Delivery
- Regional Distribution and Synchronization
- Distributed Content Delivery

Network
- Bandwidth
- Elastic IP Address
- Load Balancer
- Virtual Private Network

Metering

Compute
- Hourly Usage per Tier and OS
  : Micro, Small, Medium, Large, Extra Large
  : Linux , Windows or Open Solaris

Storage

Block Storage
- Provisioned Storage Capacity (GB / Month)
- Monthly IOPS per Volume
- Amount of Storage for Snapshots (GB / Month)

Storage as a Service
- Storage Capacity Utilization (GB / Month)
- Read/Write Transactions to Storage as a Service

Content Delivery
- Volume of Content Delivered (GB / Month)
- Total Number of Requests in a Month
- Regional Traffic Distribution

Network

Bandwidth
- Data Transfer In/Out (GB / Month)
- Regional Data Transfer (GB / Month)
- Public IP / Elastic IP Data Transfer (GB/Month)

IP Address
- Number of IP Addresses Used in a Month
- Hours of Usage / Month
- Number of Elastic IP Remaps in a Month

Load Balancer
- # of Load Balancers
- Data Processed by Load Balancers (GB / Month)

Virtual Private Network
- Number of VPN Connections
- Data Transfer In/Out of VPN (GB / Month)

Billing

On-Demand; Pay per Use; Monthly Billing
- Pay only for what you use; No Minimum Fees
- Hourly À la carte Pricing for Compute Instances
- Tiered Pricing for Storage and Data Transfer
- Volume & Transaction based Pricing for CDN
- Service Credits when SLA is not maintained

Reserve & Get discounts on usage charges
Reserve Compute Instances for Yearly Terms with a low one-time payment, and get a significant discount on the hourly charges for on-demand Compute Instances

Bid for Low Price; use it when available
Bid for unused Cloud Capacity and pay lower rate on the hourly charges for on-demand Compute Instances – bid with a maximum price you are willing to pay for Compute Instances and use them only when available

Sign-up and get free daily or monthly quota of Infrastructure Resources for up to one year ; No Minimum Fees; No Commitments

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Typical Cloud Service Catalog, Metering & Billing

PaaS

Database

Database as a Service

Relational Database Instances:

: Small, Medium, Large, Extra Large

: My SQL, Oracle, SQL Server

- High Availability and Backup

Service Bus and Notification as Services

- Unicast / Multicast Message Delivery
- Publish and Notify Events

Billing and Payments as Services

- One-Time Charge, Recurring Charge
- Metered Usage Charge
- Balance Transfers,
- Bank Account Debits, Credit Card Transactions

Identity and Access Management

- Credentials, Security Policies, Authorization

Metering

Database

Database as a Service

- # of Entities stored in a Month
- # of Attributes per Entity
- Total Size of Attributes Stored (GB / Month)
- Total # of Requests executed in a Month

Relational Database

- Hourly Usage per Tier and Database Types
: Small, Medium, Large, Extra Large
: My SQL, Oracle, SQL Server
- Provisioned Storage Capacity (GB / Month)
- Total # of Database IO Requests in a Month
- Backup Storage Capacity per Month

Service Bus as a Service

- # of Service Bus Connections
- Total # of Requests executed in a Month

Notification as a Service

- Total # of Requests executed in a Month
- Total # of Notifications sent in a Month

Billing as a Service

- Total # of Bills generated in a Month
- Charging Model and their Financial values

Payments as a Service

- Total # of Payment Transactions in a Month
- Payment Methods and their Financial values

Identity and Access Management

- Total # of Access Control transactions per Month

Billing

On-Demand; Pay per Use; Monthly Billing

- Pay only for what you use; No Minimum Fees
- Hourly À la carte Pricing for Relational Database
- Tiered Pricing for Storage and Data Transfer
- Transaction base Pricing for Shared Services
- Service Credits when SLA is not maintained

Flexible Pricing for Billing and Payments

Use Payments Service Sandbox for free, and pay % of the transaction value and a low fee for each transaction

Use Billing Service for free, and pay % of the revenue (above and beyond your cost to Cloud Provider) and a low fee for each bill

Reserve & Get discounts on usage charges

Reserve Relational Database Instances for Yearly Terms with a low one-time payment, and get a significant discount on the hourly charges for on-demand Relational Database Instances

Sign-up and get free daily or monthly quota of Shared Services for up to one year ; No Minimum Fees; No Commitments

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Typical Cloud Service Catalog, Metering & Billing

SaaS

Enterprise

Collaboration and Productivity
- Chat, Email, Document Mgmt, Online Meetings
- Documents, Sheets, Presentations, Calendar

CRM
- Sales Force Automation
- Marketing
- Customer Service and Case Management

ERP*
- Accounting and Revenue Management
- Supply Chain Management
- Order Management, Fulfillment and Billing
- Human Capital Management
- Services Resource Planning

Application Market Places

* Typically offered via SI and VAR

Consumer

Cloud Drives

Messaging and Collaboration

Media Content and Online Streaming

Search Engines

Social Networking

Application Market Places

...

Metering

Enterprise LOB

Collaboration and Productivity
- # of Users
- # of Mail Boxes
- # of Workspaces
- # of Hosts, Participants, Meetings and Durations
- Addl. Storage Add-On (in GB) for Mail Boxes
- Addl. Storage Add-On (in GB) for Workspaces

CRM
- # of Users, Leads, Contacts, Emails, Cases
- # of Workflows
- Addl. Storage Add-on (in GB)

ERP
- # of Users, Orders, Bills, Resources, Work Force
- # of Workflows and Customization
- Addl. Storage Add-On (in GB)

Billing

Enterprise SaaS
- Monthly/Yearly Subscription base Tiered Pricing
- Pricing per Seat per Month
- Reduced Pricing per Seat on Yearly Terms
- Additional Charges for Add-on Features/Capacity
- Service Credits when SLA is not maintained

Consumer SaaS
- Monthly Subscription base Tiered Pricing
- One-time Charge
- Transaction or Usage based Charges
- Ad-funded Free Services
- Free Services with Limited Features/Capacity

SaaS Providers' Settlements
- Receive % of the Ad-Revenue from the Hoster
- Pay % of the revenue and a low fee for each Payment Transaction (Consumer SaaS) to Hoster
- Pay % of the revenue and a low fee for each bill (Enterprise SaaS) to Hoster
- Pay PaaS and IaaS Usage Charges to Hoster

Sign-up for Free Trials, Sign-up for Free of Cost Services with limited Features/Capacity; No Minimum Fees; No Commitments

Private & Confidential

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Thank You

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