Cloud Service Metering, Accounting and Billing

Universität Stuttgart, 10.03.2010
Agenda

1. Introduction
   - Definition and Problem Space
2. Metering, Accounting and Billing Use Cases
   - Finance Management in the Cloud Lifecycle
   - Roles and Major Building Blocks
3. Architecture and Implementations
4. TSAM and TUAM Example
5. Summary
Cloud Computing …

“Cloud” is an emerging consumption and delivery model for many IT-based services, in which the user sees only the service, and has no need to know anything about the technology or implementation.

Attributes

- Standardized, consumable web-delivered services
- Flexible pricing
- Elastic scaling
- Rapid provisioning
- Advanced virtualization

VISIBILITY — CONTROL — AUTOMATION

….service oriented and service managed
IBM Cloud Delivery Models (IBM as Service Provider)

1. Private Cloud
   - Enterprise owned and operated
   - IBM Smart Business Services – Private Cloud Services, behind your firewall
   - IBM owned and operated
   - IBM Smart Business Services - Standardized Services on the IBM Cloud

2. Private Hosted
   - Customer/IBM owned and IBM operated (single tenant)

3. Shared Private Cloud
   - IBM owned and operated (multi-tenant)

4. Public Cloud
   - IBM owned and operated (multi-tenant)

Customer owns and pays for infrastructure and has unlimited exclusive access

IBM owns infrastructure and customer has shared access and pays by usage
Cloud Types and Service Metering, Accounting and Billing Consideration

<table>
<thead>
<tr>
<th>Cloud Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Private Cloud</td>
<td>Understand the costs, usage based chargeback to departments, Internal IT cost center (cost recovery)</td>
</tr>
<tr>
<td>Managed Private Cloud</td>
<td>Service Provider Contract, dedicated HW (single tenant)... Internal chargeback (cost recovery)</td>
</tr>
<tr>
<td>Hosted Private Cloud</td>
<td>Service Provider Contract, dedicated HW (single tenant)... Internal chargeback (cost recovery)</td>
</tr>
<tr>
<td>Shared Private Cloud</td>
<td>Service Usage and Consumption, Contracting and Billing (the talk today)</td>
</tr>
<tr>
<td>Public Cloud</td>
<td>Service Usage and Consumption, Contracting and Billing (the talk today)</td>
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</tbody>
</table>
Finance Management for Cloud Services

Cloud Service Request and Request Approval
- See Price for advertised services
- Select cloud service and start metering

Cloud Offering Creation & Registration
- Offer Service based on QoS, and Price

Cloud Service Definition
- define SLA, KPIs and Finance/Cost/Price and account models (Finance planning)

Cloud Service Instance Operation
- meter IT resource consumption
- consider capacity changes
- Build Reports and Invoice

Cloud Service Instance Termination
- Stop metering
- correlate usage data
- Receive Invoice

Cloud Service Termination
- Remove from catalog
- Build final reports

Cloud Service Instance Operation
- Start metering
- Stop metering
- process reports

Finance Planner
- manage SLA, KPIs and Finance/Cost/Price

Service Offering Manager
- manage cloud service offering

Requestor (e.g. Line of Business)
- request cloud service

Cloud Provider Administrator
- manage cloud provider and metering

Service Offering Manager
- manage cloud service offering

Service Management Platform
- Process Engine + Middleware
- Virtualized and Standardized Resources + Physical Assets
Cloud Computing Roles – Overview

**Cloud Service Consumer**
- **Consumer Business Manager**: Responsible for financial (e.g., approval) responsibility for consumed services.
- **Consumer End User**: Uses service instances provided by service provider.
- **Consumer Administrator**: Requests service instances and changes of service instances (typically on behalf of Consumer Business Manager).

**Cloud Service Provider**
- **Service Business Manager**: Offers all types of services (SPI) developed by service developer.
- **Consumer**: Accounts for services consumers for services potentially offered by service provider themselves and services offered on behalf of service developer.
- **Service Operations Manager**: Manages technical infrastructure required for providing cloud services.

**Cloud Service Developer**
- **Service Security Manager**: Responsible for ensuring that the Service Provider appropriately manages risks associated with development, delivery, support and use of services.
- **Service Transition Manager**: Responsible for enabling a consumer to use the cloud service, incl. boarding, integration, and process adoption.

Service Providers offer services based on a management infrastructure. They may also develop services. Service Providers can build their services by (optionally) consuming services provided by other service providers. Service Providers can host services developed by other service developers (on top of their own services).

Note: One person can play several roles.

Interlock with Cloud Standards team:
Role + Use Case Definitions leveraged for DMTF Cloud Incubator.

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Terminology - Dimensions

- **Resource Usage**
  - **Reserved Capacity**
  - **Allocated Capacity**
    - **Shared between Services**
    - **Dedicated to one Service**

- **Completed Service Requests**

- **Resource Consumption**
Cloud Computing, Service Metering, Report & Analytics

Metering Reporting & Analytics: Data Flow –

Runtime Data Flows

SLA Management → SLA Credits

Cost/Price Analytics → Usage Analytics → Usage Reports → Rated Usage Reports

Provider’s Reporting & Analytics of Usage Accounting Records

Qualified Usage Accounting Records Generation

Correlated Usage Records

Metered Usage Data Correlation

Metered Usage and Consumption, IT Resource, Labor

Metered Usage Data Generation

Instrumented Service Management System

Design Time Data

Billing Records

Adjustment

Tax Rules

Billing Terms

Contracts & Agreements

Rates /Prices

Accounting Structures

Usage Data Qualification Rules

Correlation & Aggregation Rules (Service)

Data Correlation & Aggregation Rules (Source)

Metrics Definition

Business context

Service context

Local context

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Metering Reporting & Analytics: BSS – OSS Mapping

**BSS**

- Cost/Price Analytics
- Usage Analytics
- Usage Reports
- Rated Usage Reports

**Provider’s Reporting & Analytics of Usage Accounting Records**

- Qualified Usage Accounting Records

**Qualified Usage Accounting Records Generation**

**OSS**

- Correlated Usage Records

**Metered Usage Data Correlation**

- Metered Usage and Consumption, IT Resource, Labor

**Metered Usage Data Generation**

- Instrumented Service Management System

**Billing Record Generation**

- Billing Records
- Adjustment
- Tax Rules
- Billing Terms
- Contracts & Agreements
- Rates /Prices
- Accounting Structures
- Usage Data Qualification Rules
- Correlation & Aggregation Rules (Service)
- Data Correlation & Aggregation Rules (each source)
- Metrics Definition

**Business context**

**Service context**

**Local context**
Finance Management for Clouds: Taxonomy

Service Layer

Cloud Requestor  Cloud Service Approver  Service and Finance Planner  Cloud Service Offering Mgr  Cloud Service Administrator

Data Layer

Monitoring and Action Layer

Infrastructure Layer

VMControl x,p,z  VMWare Virtual Center  WAS Cloudburst  Xen, KVM, p, z

Virtualized Infrastructure & Hypervisors Server, Storage, Network

Application and Middleware artifacts

TSAM  TUAM

Cloud Requestor
Cloud Service Approver
Service and Finance Planner
Cloud Service Offering Mgr
Cloud Service Administrator
TSAM and TUAM Architecture

IT Service (Infrastructure & Application) Provider

Tivoli Process Automation Engine
TPAE

Solution Content
(good practices)

- Base Service Templates
- WAS Service Templates
- WAS Cloudburst Template
- Accounting
- Pricing
- Reports
- Metering

Solution Runtime

- Offering Mgmt
- Service Mgmt
- Service Metering
- Provisioning
- eTUAM Reporting
- eTUAM Account/Price Mgmt
- eTUAM Billing
- eTUAM Data collection

Infrastructure & Virtualization VM

- DCM Reservations
- Assets, CIs Integration
- Price/Acct Models
- Usage Data
- eTUAM Hypervisor CSR

Cloud Service Requester/Approver

Cloud Service Provider Admin

BSS Billing System Models

Service Planning

Service Offer and Planning

Service Publishing Tools

Service Fulfillment & Configuration Tools
UI, Fulfillment, Data, MetaData

Service Monitoring Tools KPIs

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Cloud Management and eTUAM Converged Architecture – Interactions – Definition

Cloud Service Requestor

Cloud Service Requester

Cloud Admin

BSS Billing System Models)

IT Service (Infrastructure & Application) Provider

Tivoli Process Automation Engine (TPAE)

Solution Content

Base Service Templates
WAS Service Templates
WAS Cloudburst Template
Accounting
Pricing
Reports
‘Metering

Solution Runtime

Offering Mgmt
Service Mgmt
Service Metering
Provisioning

eTUAM Reporting
eTUAM Account/Price Mgmt
eTUAM Billing/DB Load
eTUAM Data collection

TPAE

DCM Reservations
Assets, CIs Integration
Price/Accounting Models

Topologies Management Plans
People, Org Labor
Usage Data

eTUAM Hypervisor CSR

Infrastructure & Virtualization VM

Define
- Account Structure
- Metering and Price Models

Service Definition and Planning

Service Publishing Tools

Service Fulfillment & Configuration Tools
UI, Fulfillment, Data, Metadata

Service Monitoring Tools KPIs
Cloud Management and eTUAM Converged Architecture – Interactions - Offering

IT Service ( Infrastructure & Application) Provider
TPAE

Solution Content
Base Service Templates
WAS Service Templates
WAS Cloudburst Template
Accounting
Pricing
Reports
* Metering

Solution Runtime
Offering Mgmt
Service Mgmt
Service Metering
Provisioning

eTUAM Reporting
Account/Price Mgmt!
Billing DBLoad
Data collection

DCM
Topologies
Mgmt Plans
Assets, CIs
Integration
Price/Acct
Models
Usage Data

People, Org
Labor

Infrastructure & Virtualization VM

Cloud Service Requestor

Cloud Service Creator/Planner

Cloud Admin

BSS
Billing System Models

Service Planning
Service Definition and Planning

Service Fulfillment & Configuration Tools
UI, Fulfillment, Data, MetaData

Service Monitoring Tools
KPIs

Publish Service
Service Definition including Price

People, Org
Labor

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Cloud Management and eTUAM Converged Architecture
Architecture – Interactions – BSS Interactions (draft)

Cloud Service Requestor

Cloud Admin

Cloud Service Requester

Solution Content

Solution Runtime

TPAE

Base Service Templates
WAS Service Templates
WAS Cloudburst Template
Accounting
Pricing
Reports
Metering

Offering Mgmt
Service Mgmt
Service Metering
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eTUAM Reporting
eTUAM Account/Price Mgmt
eTUAM Billing DBLoad
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IT Service (Infrastructure & Application) Provider

Tivoli Process Automation Engine

Service Planning

Service Definition and Planning

Service Publishing Tools

Service Fulfillment & Configuration Tools

UI, Fulfillment, Data, MetaData

Service Monitoring Tools

KPIs

Apply/Receive Price Models
Receive Reports
Receive Usage Data

System Models)
Thank You

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ibm.com/cloud

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